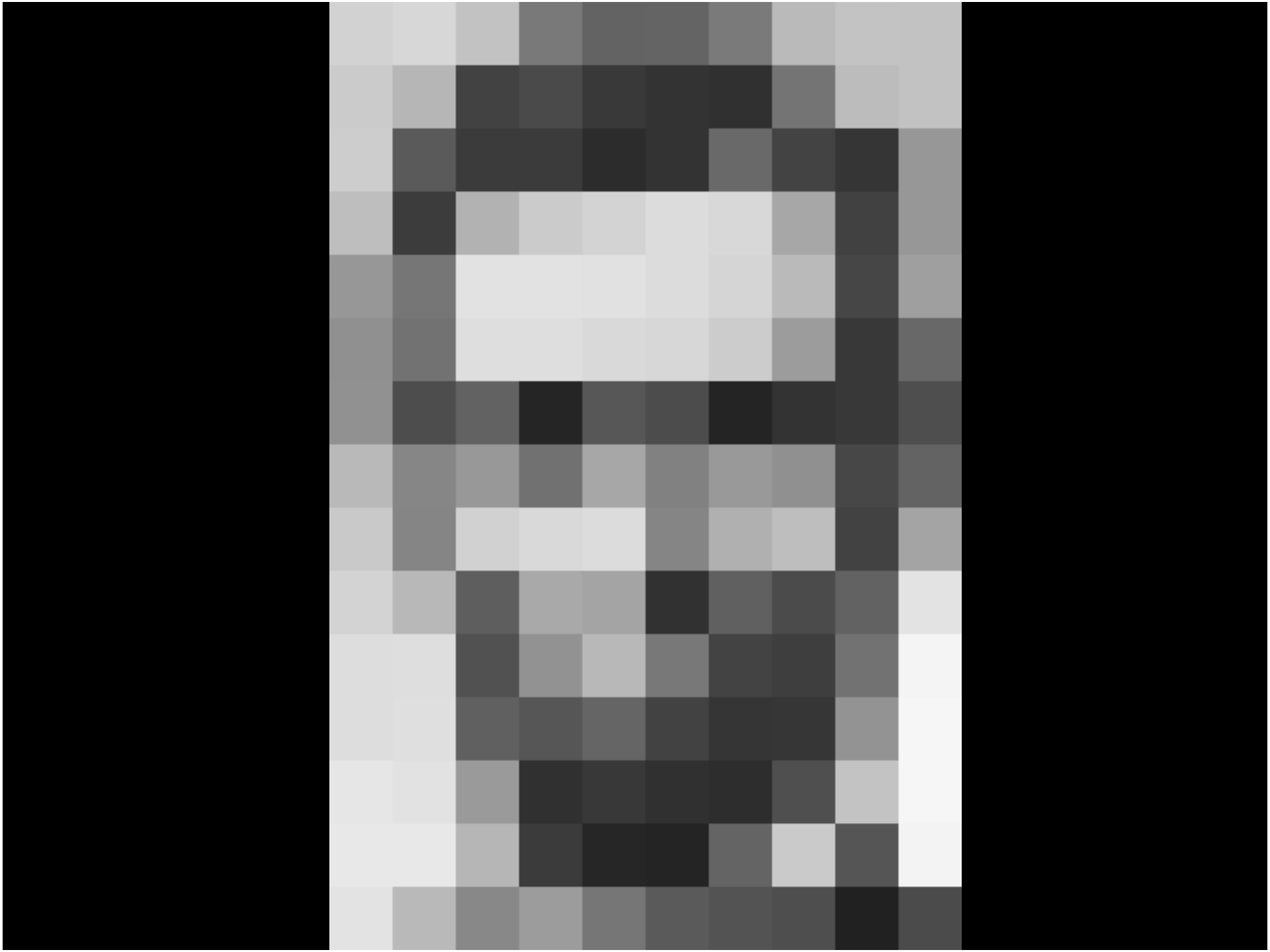
Transportation Design for Communities

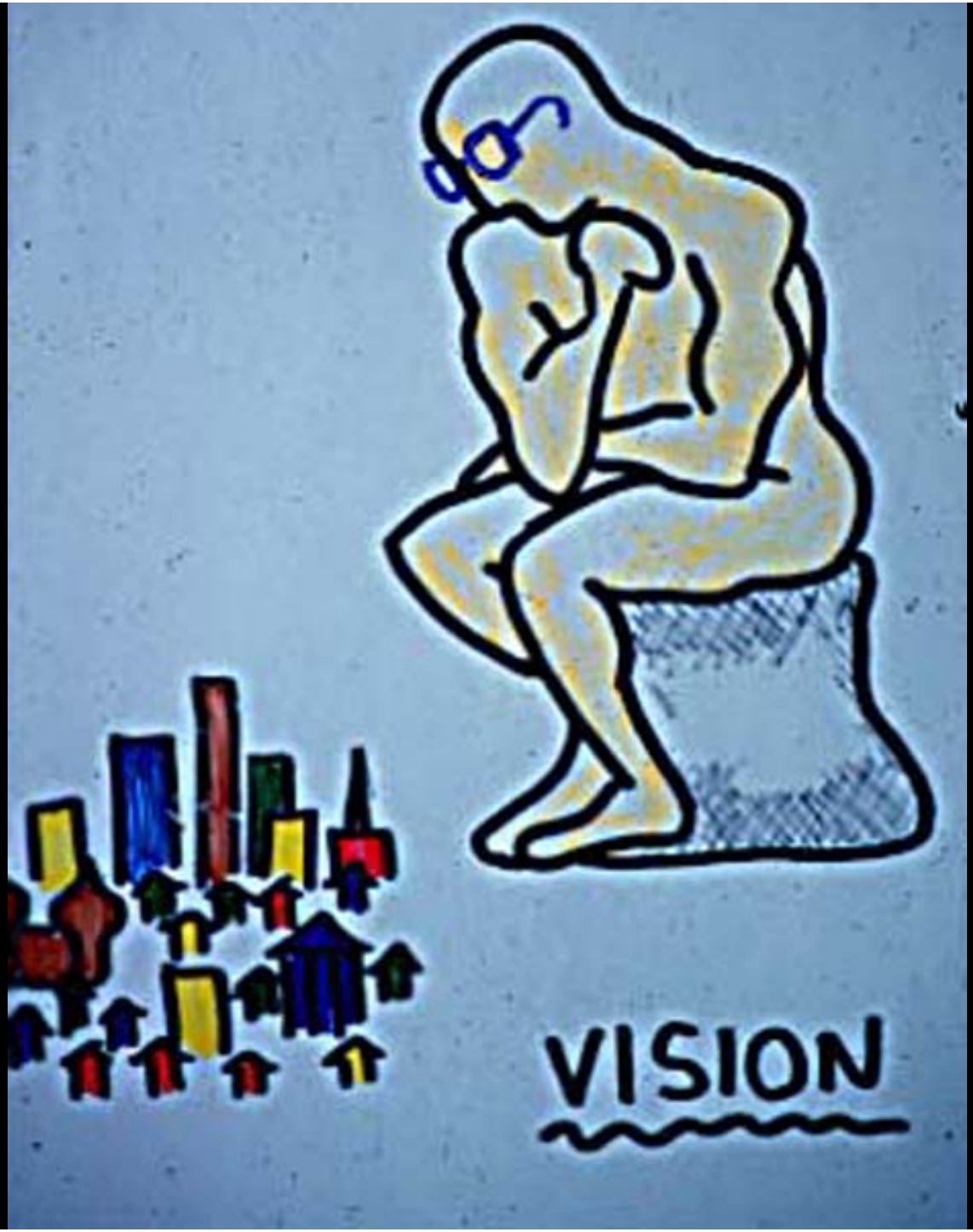
Hosted by the Center for Quality Growth and Regional Development at the Georgia Institute of Technology

Keynote Address: Redefining Context

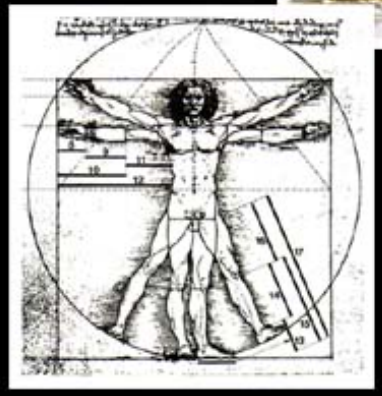
May 11, 2006 Atlanta, GA

Presenter: Ian Lockwood – Principal – Glatting Jackson Kercher Anglin Lopez Rinehart, Inc.

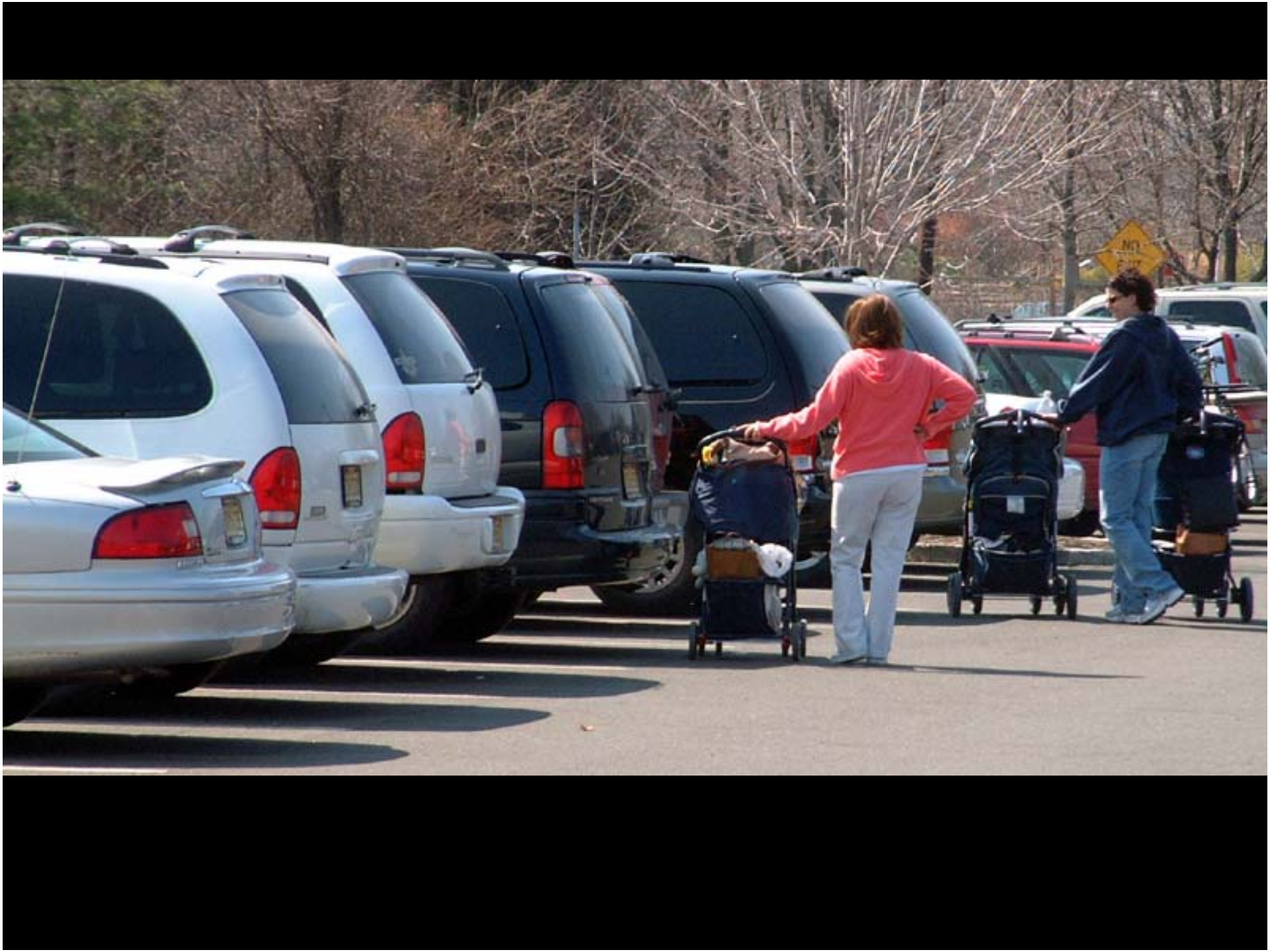



VISION


WATCHMAKING
The Hungry I Restaurant
ANTIQUES



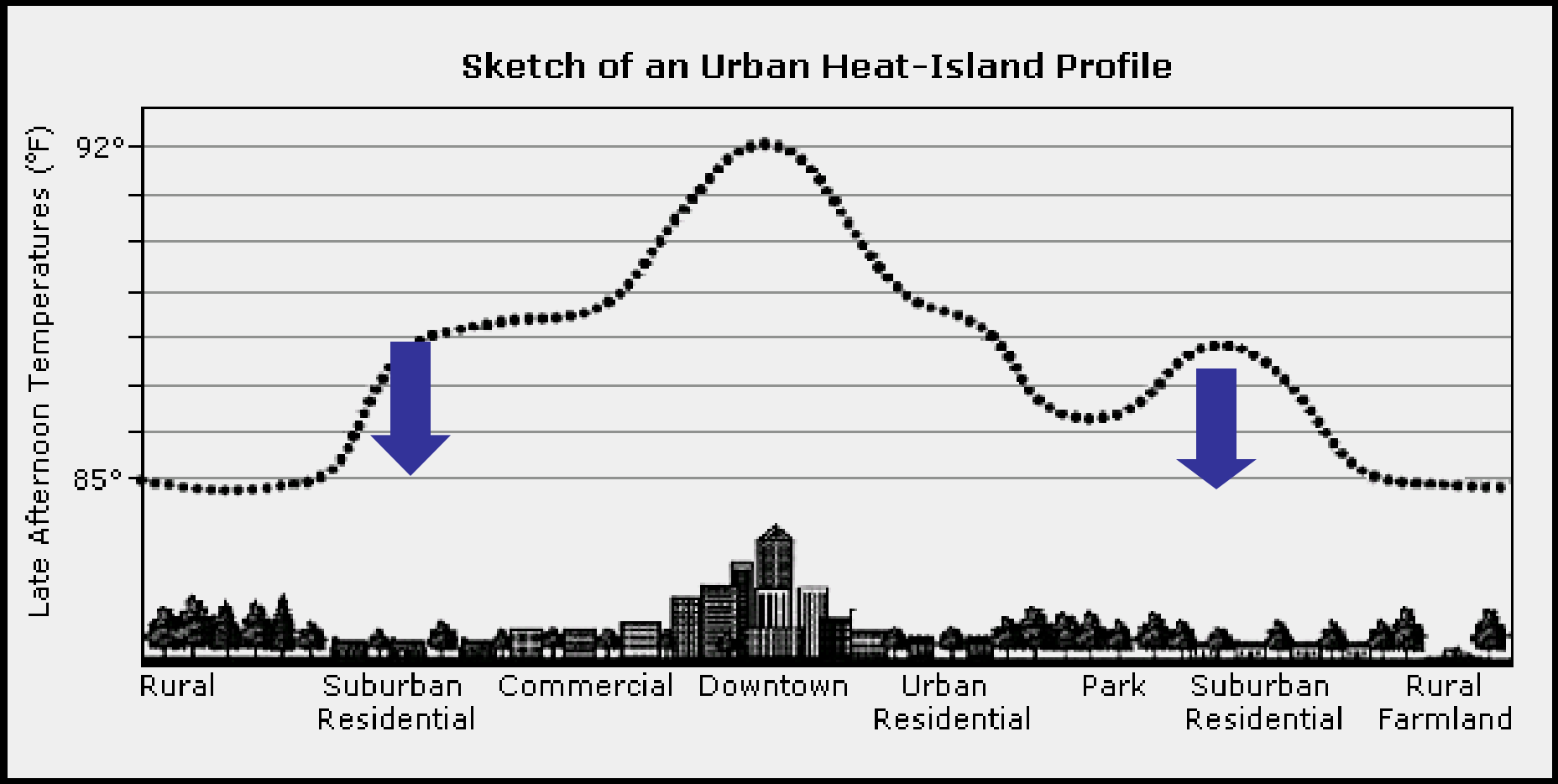

HILLSBORO CORNER
ENTER
STOP




93 NORTH
LEFT LANE
Hardee's
Chevron


93 NORTH
LEFT LANE
Hardee's
Chevron

Metro Atlanta removes
58 acres of forested land/day


Sketch of an Urban Heat-Island Profile
Late Afternoon Temperatures (°F)
92°
85°
Rural
Suburban Residential
Commercial
Downtown
Urban Residential
Park
Suburban Residential
Rural Farmland

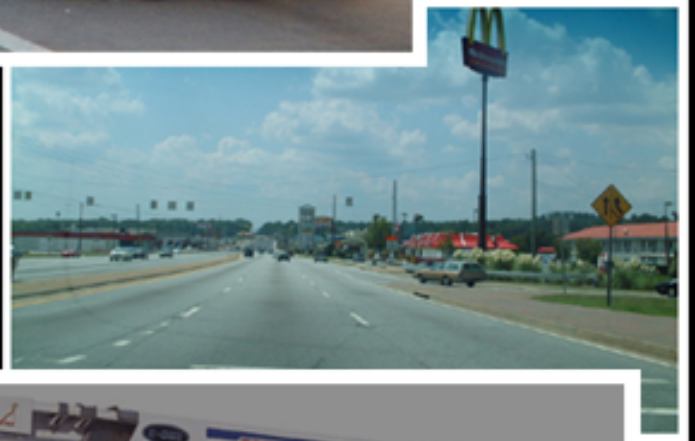
U. S. Agents in Chicago Track a Subtle Health Hazard: Heat

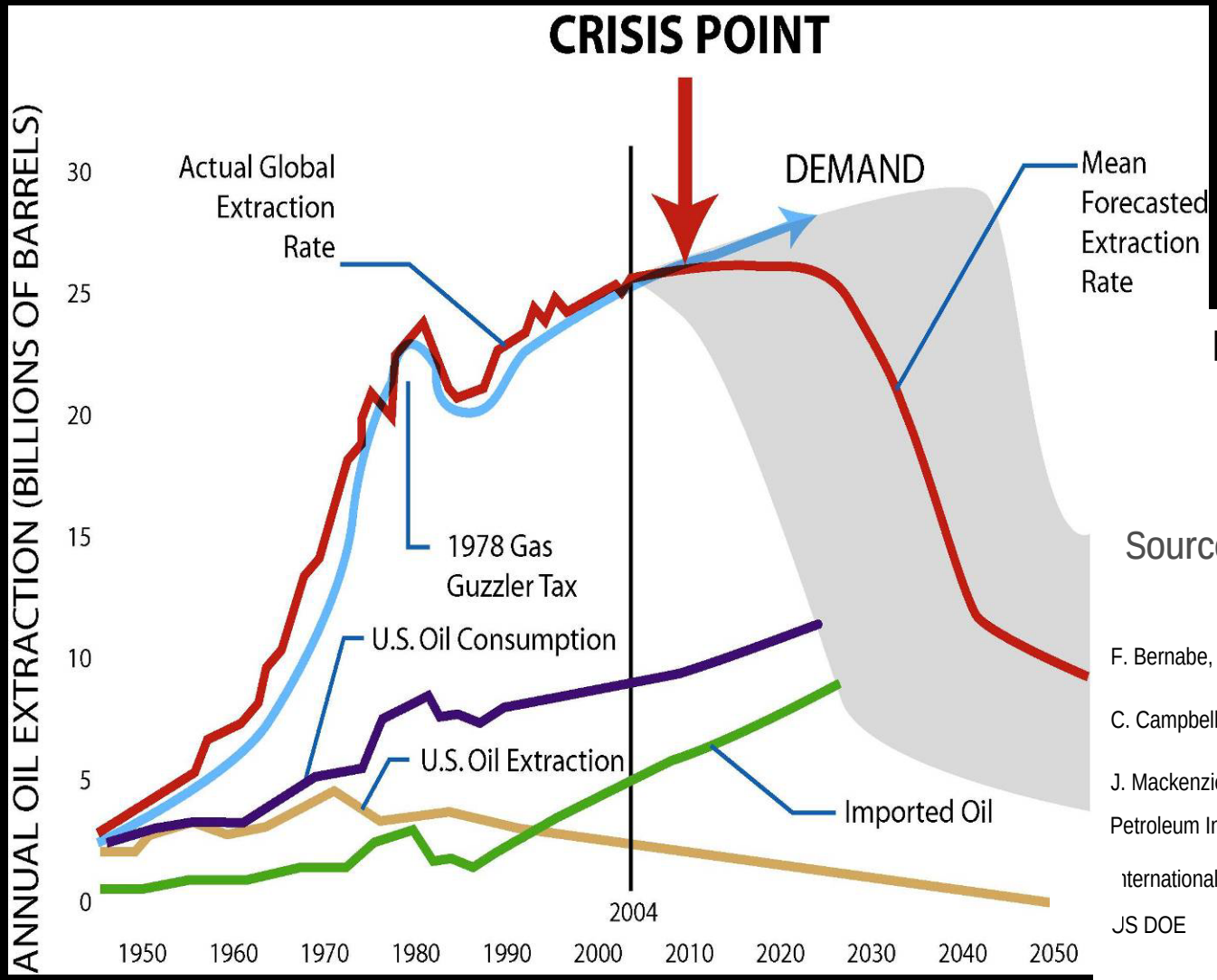
Associated Press

Federal health agents are in Chicago trying to determine the contributing factors to the more than 500 deaths related to the heat in July. Coffins containing the bodies of unclaimed victims were loaded on a truck by a Cook County morgue worker this summer for a mass burial.

1995 Chicago Heat Wave: 700 Deaths

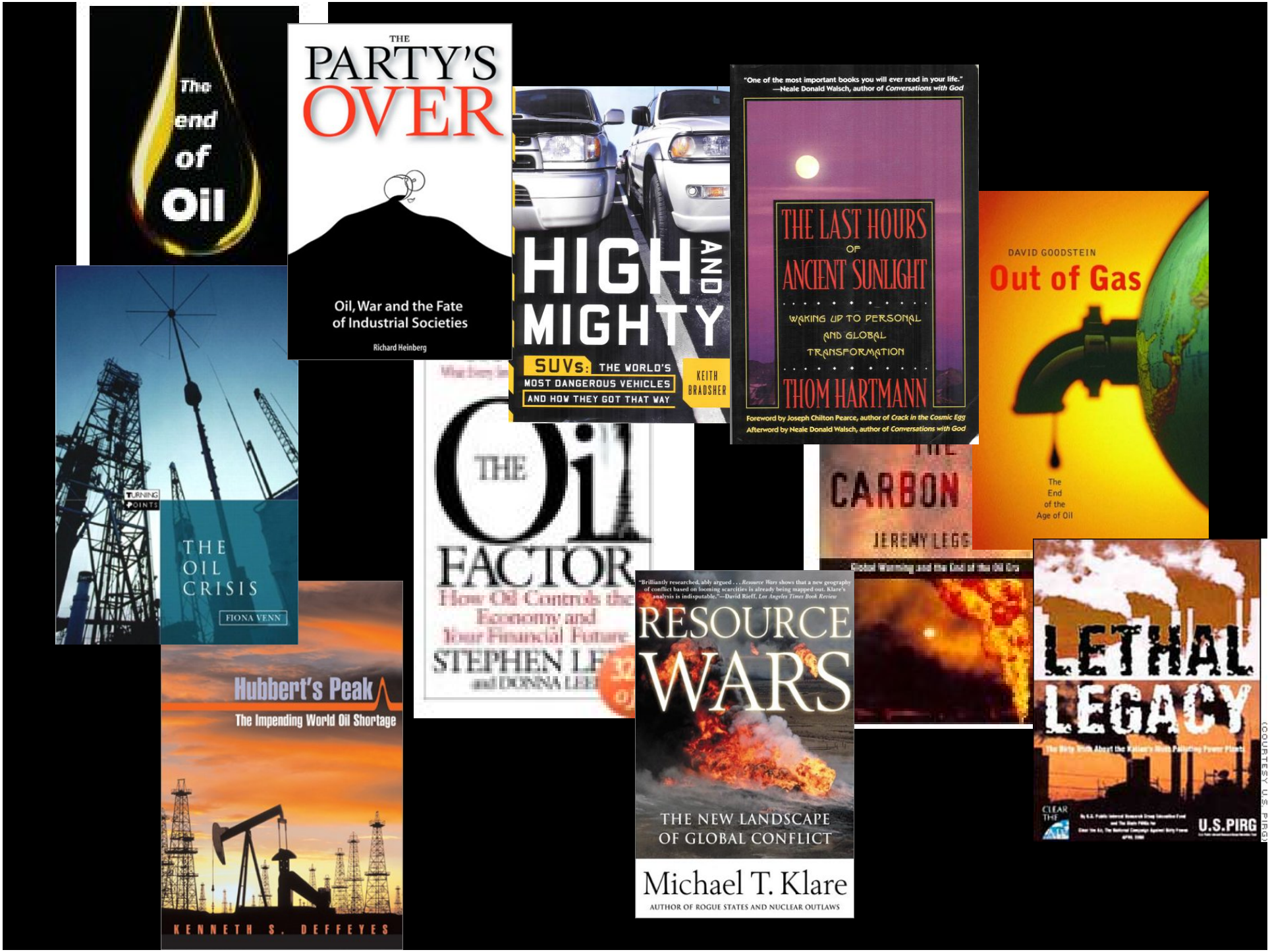

"BIGGIE SIZE"
YOUR COMBO FOR JUST
39¢





Peak Oil Reserve Forecasts

Source	Peak Date
F. Bernabe, ENI SpA	2005
C. Campbell, Petroconsultants	2005-2010
J. Mackenzie, WRI	2007-2014
Petroleum Industry	2020-2040
ıternational Energy Agency	2010-2020
JS DOE	< 2020



(COURTESY U.S. PIRG)

Solar charge electric vehicle 1997

120 miles in one hour on one charge 1993

280 mpg VW 2000

9000 mpg 2005

Vehicle Type	kWh 50 Mi. /Day	Lbs of CO_2/Year Tailpipe	Lbs of Upstream CO_2/Year*
10 MPG Gas	200	42,000	54,600
20 MPG Gas	100	21,000	27,200
30 MPG Gas	67	14,000	18,200
40 MPG HEV	50	10,400	13,600
50 MPG HEV	40	8,400	11,000
40 MPG PHEV with 25 Mile EV Range	10 for 25 Miles	5,000	6,000
PHEV with 50 Mile EV Range	22	0	800
EV-1, 120 Mile Range (built & crushed by GM)	12	0	400

GM repossessed EV-1s

and crushed them


ONLY
ONLY
RED

Pedestrian-Motor Vehicle Collisions Every Year

- Injured by cars 80,000
- Killed by cars 5,000
- 11% of all motor vehicle deaths

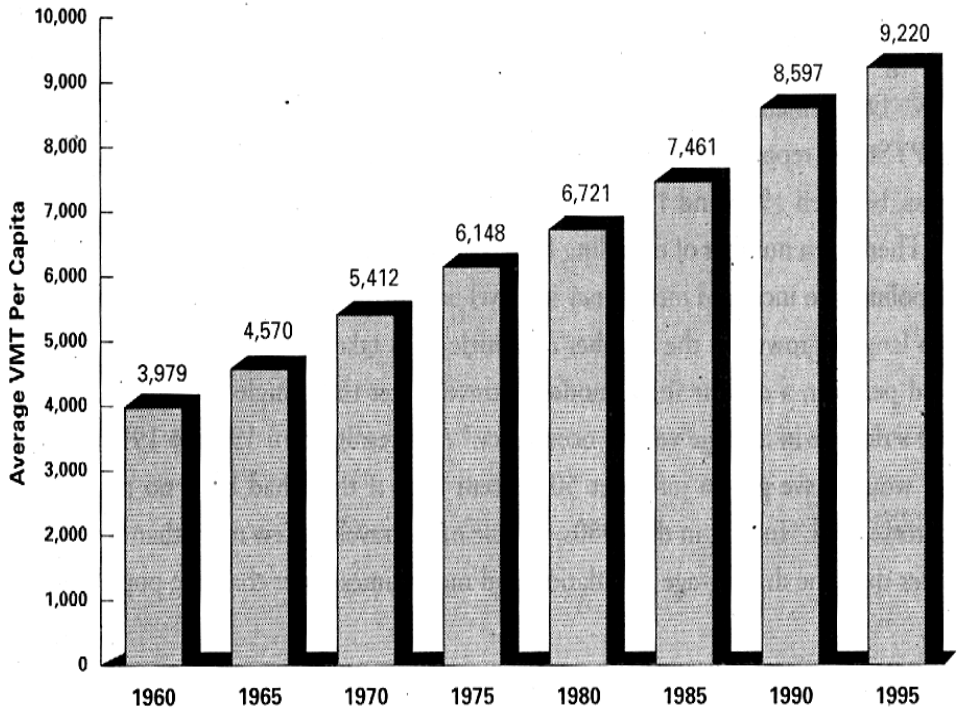
Motor Vehicle Crashes

- Leading cause of death for young people (1-24 yrs)
- Crashes:
  - kill 42,000 people
  - injure 3,400,000 people
  - cost $200,000,000,000

Vehicle Miles Traveled

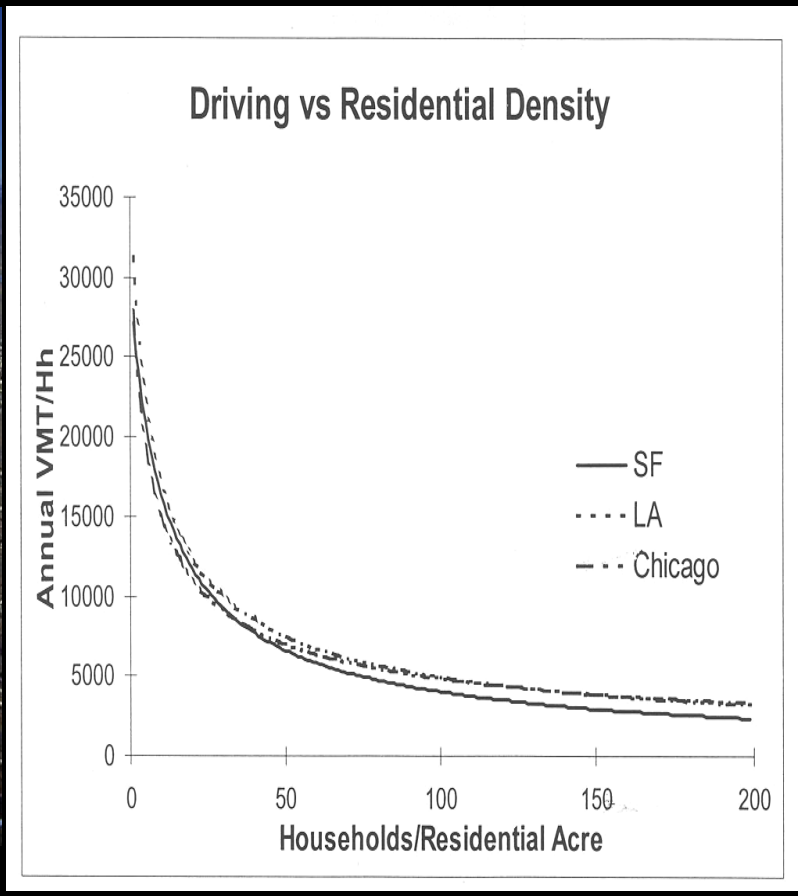
Figure 2-2
Vehicle Miles Traveled (VMT) Per Capita, 1960–1995

Source: Bureau of Transportation Statistics, U.S. Department of Transportation, *National Transportation Statistics 1998*, Washington, DC: 1998, Table 4-12; U.S. Bureau of the Census, "Historical National Population Estimates," Washington, DC: April 2, 1998.



VMT/Capita 1960-1995

Less Density = More Driving



From 1969 to 2000, Americans drive:

+88% farther to shop

+137% farther for errands

Women effected most

- **Mom/Family "chauffeur"**
- **Time in car:**
  - **All women 64 min/day**
  - **Single mothers 75 min/day**

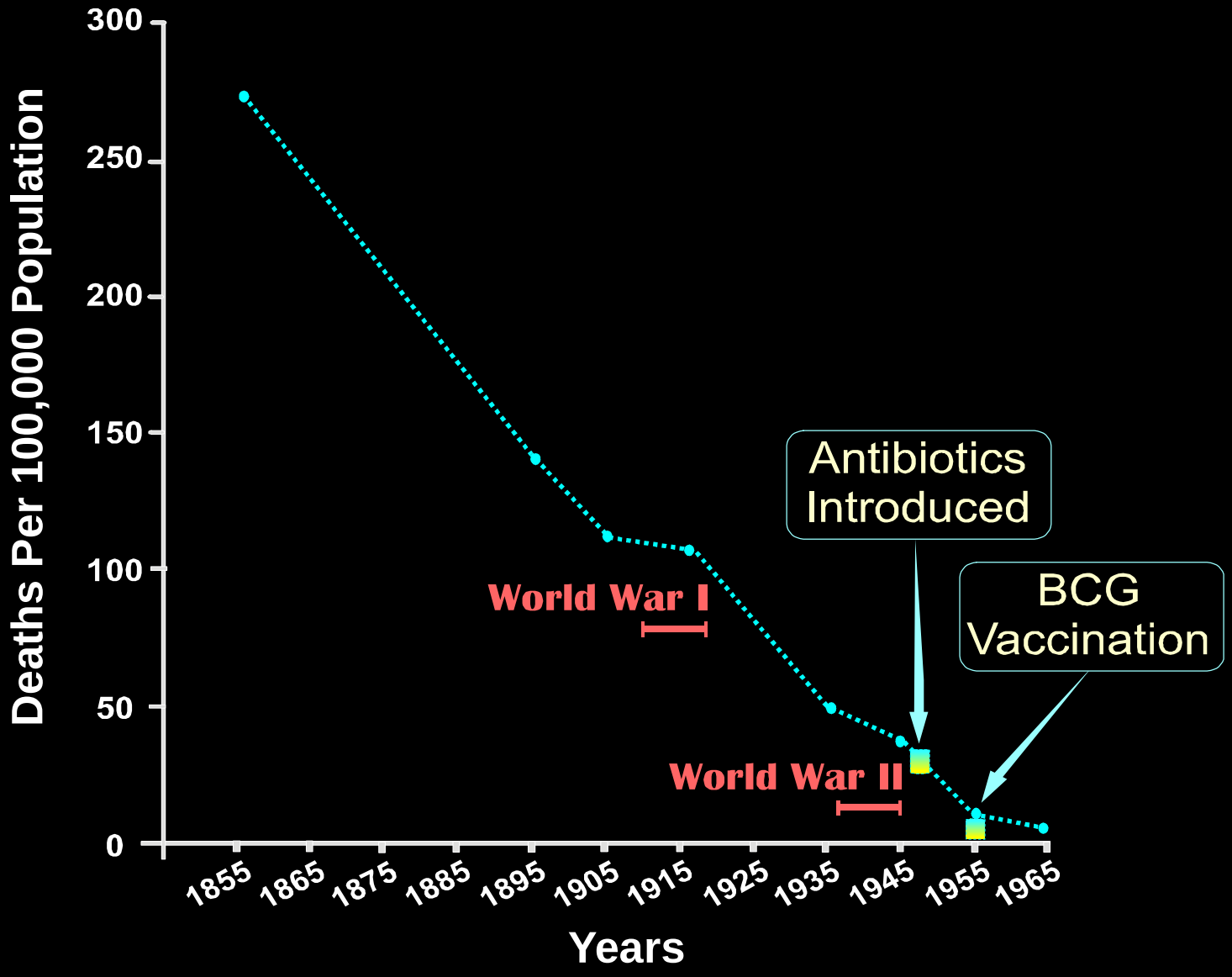
STPP 2000


LIES ABOUT
SOCIAL
SECURITY
BY ALLA
SLOA
Fat for Life?
Six Million Kids
Are Seriously Overweight.
What Families Can Do.
By Geoffrey Cowley & Sharon Begley

Health in the Late 19th Century

- Infectious diseases: TB
  Cholera
  Yellow Fever
  Malaria
- Challenges seemed insurmountable
- Architects, Planners, Builders, Public Works people engaged
- Drinking and Waste Water Systems

TB Death Rates in England 1855-1965



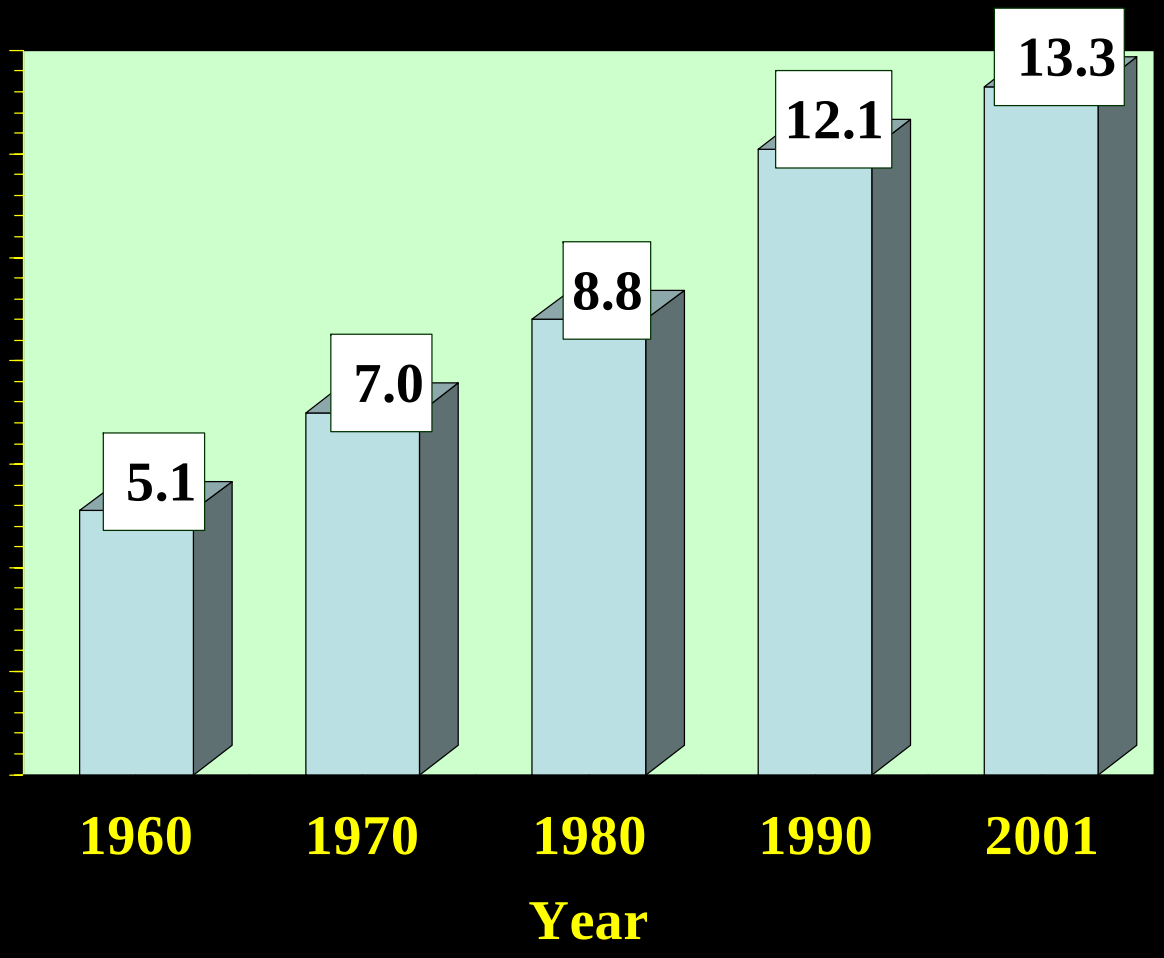
Diseases for this Century

- Cardiovascular: Heart Attack
  Stroke
- Respiratory: Asthma
  Emphysema
- Cancer & other “chronic” diseases
- Skeletal: Arthritis
  Osteoporosis

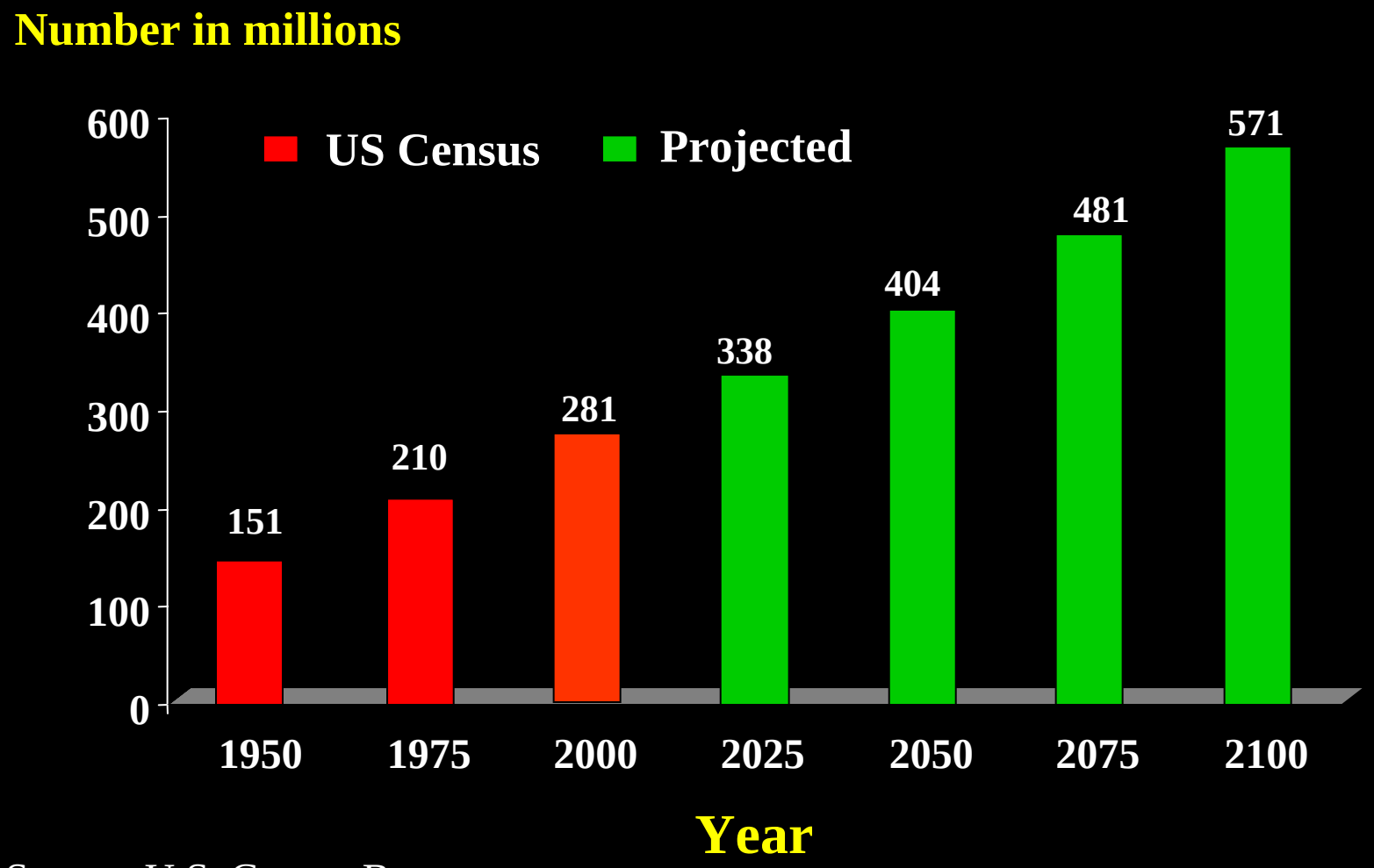
Diseases for this Century

Overweight:	Diabetes II
	Heart Disease
Mental Disorders:	Depression
	Anxiety
	Developmental
	Substance Abuse
Macro-environment:	Climate
	Conflict

Health Care Expenditures as % of GDP 1960-2001



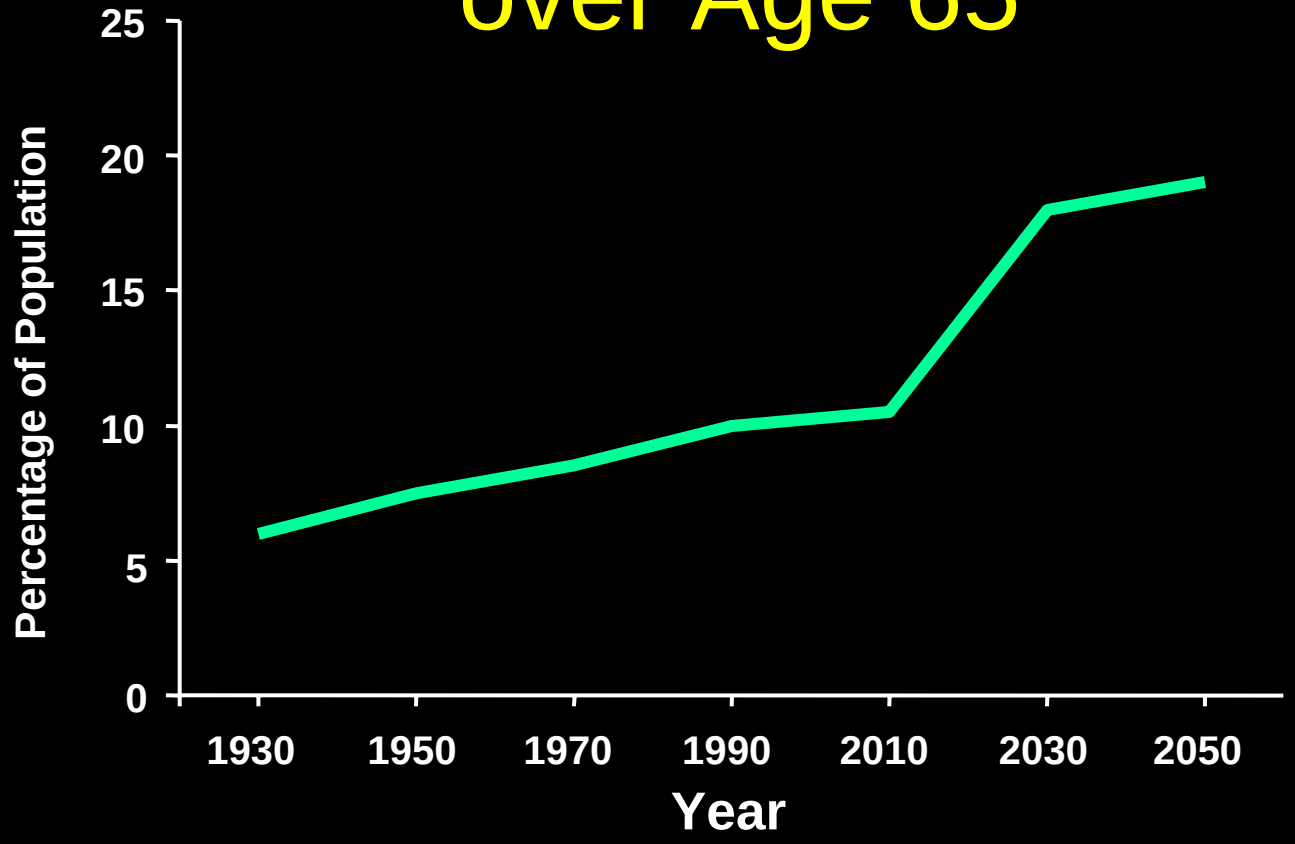
U.S. Population, 1990-2100



Source: U.S. Census Bureau

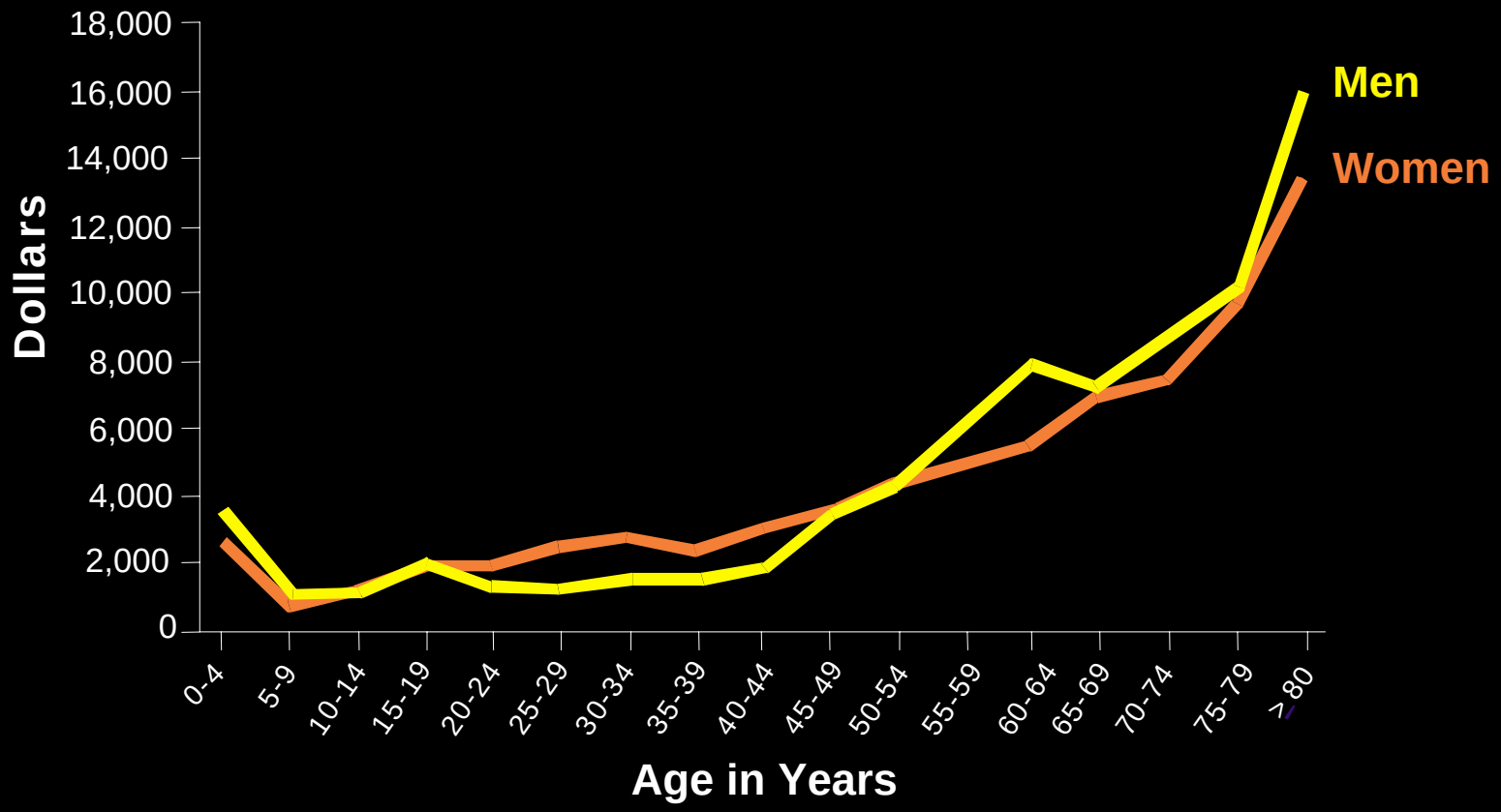
An Aging Population

Percentage of U.S. Population over Age 65



Source: From Baby Boom to Elder Boom: Providing Health Care for an Aging Population

Estimated Per Capita Health Expenditures by Age and Sex, 1995

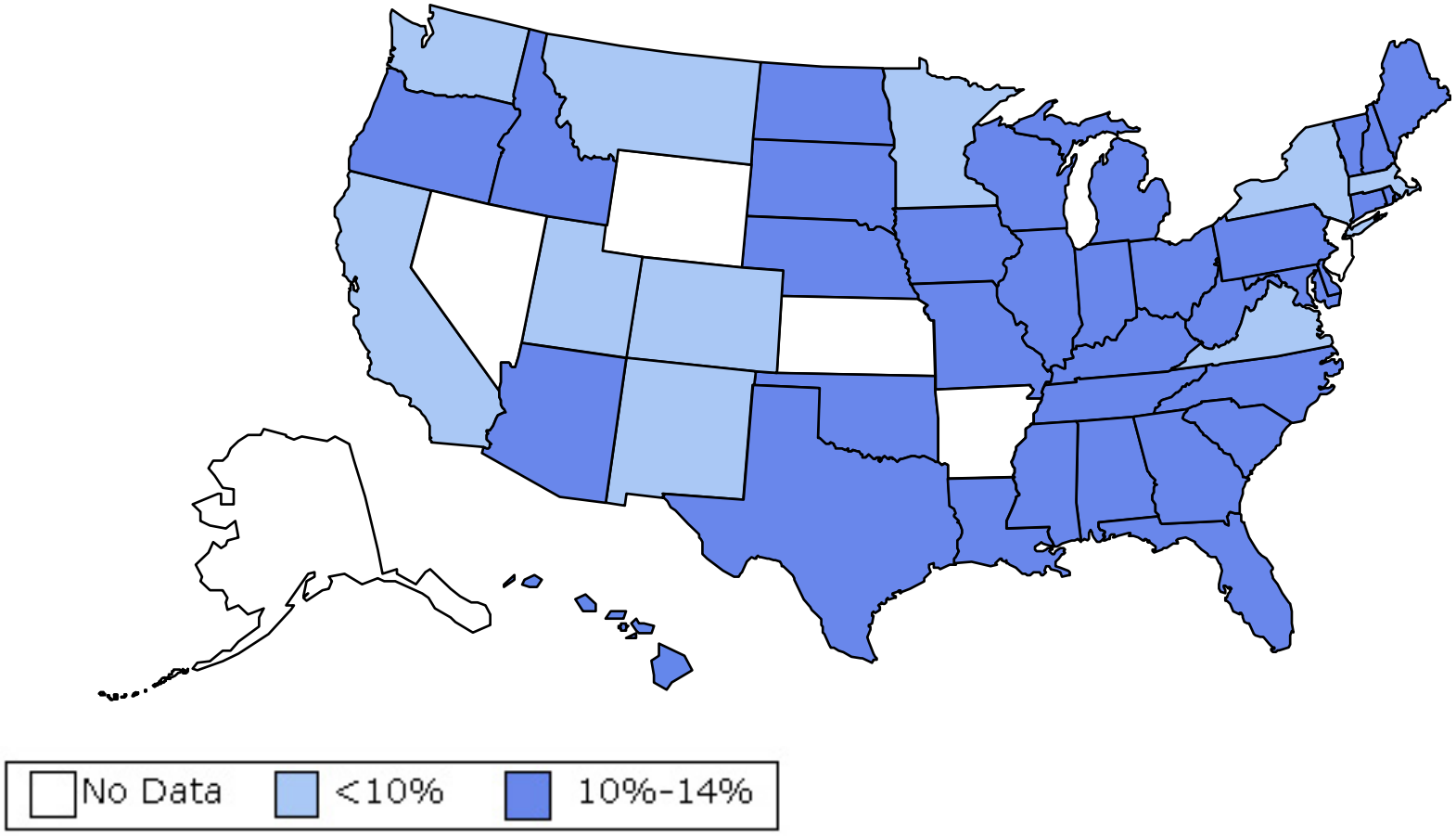


Source: From Baby Boom to Elder Boom: Providing Health Care for an Aging Population

Obesity Trends* Among U.S. Adults

BRFSS, 1990

(*BMI ≥30, or ~ 30 lbs overweight for 5'4" woman)



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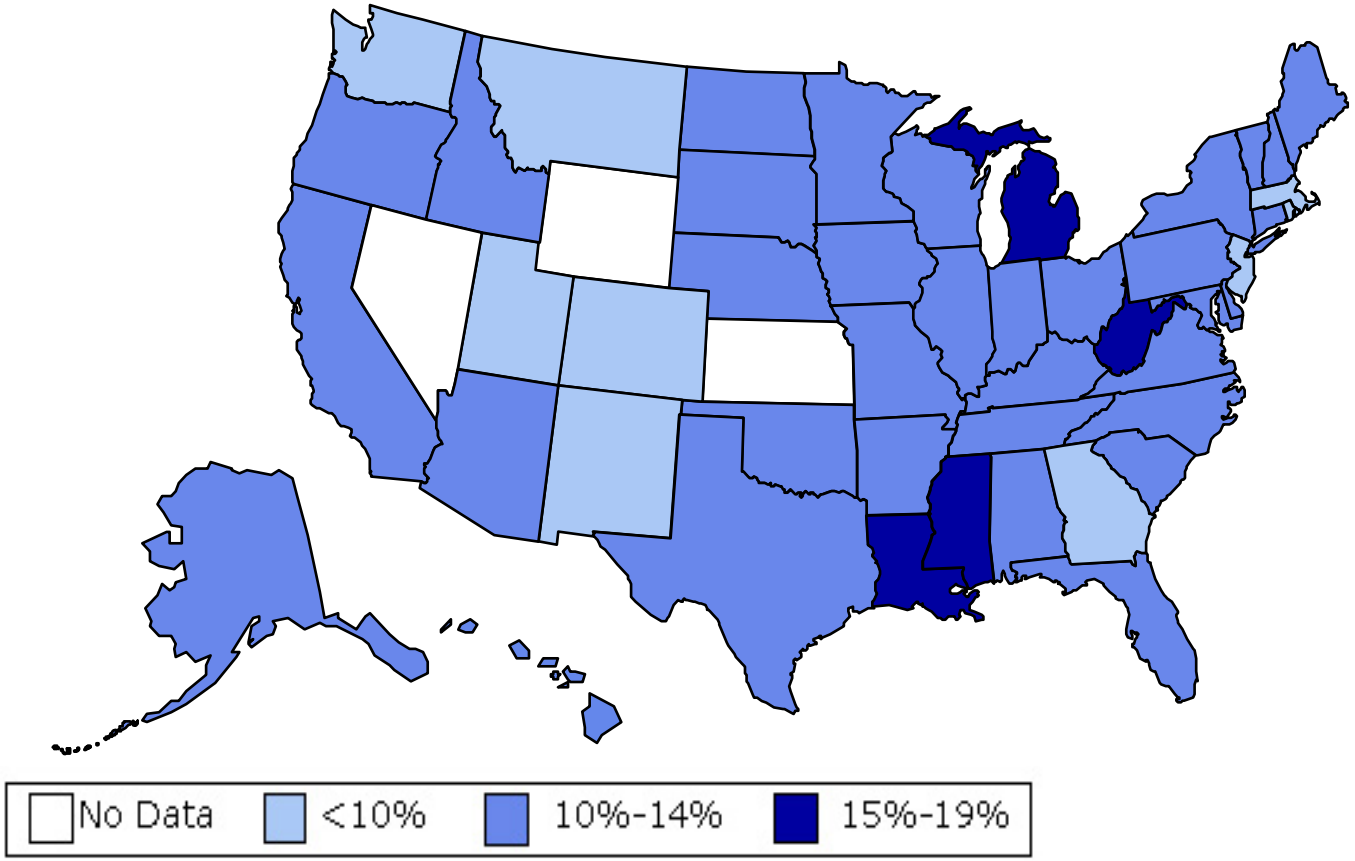

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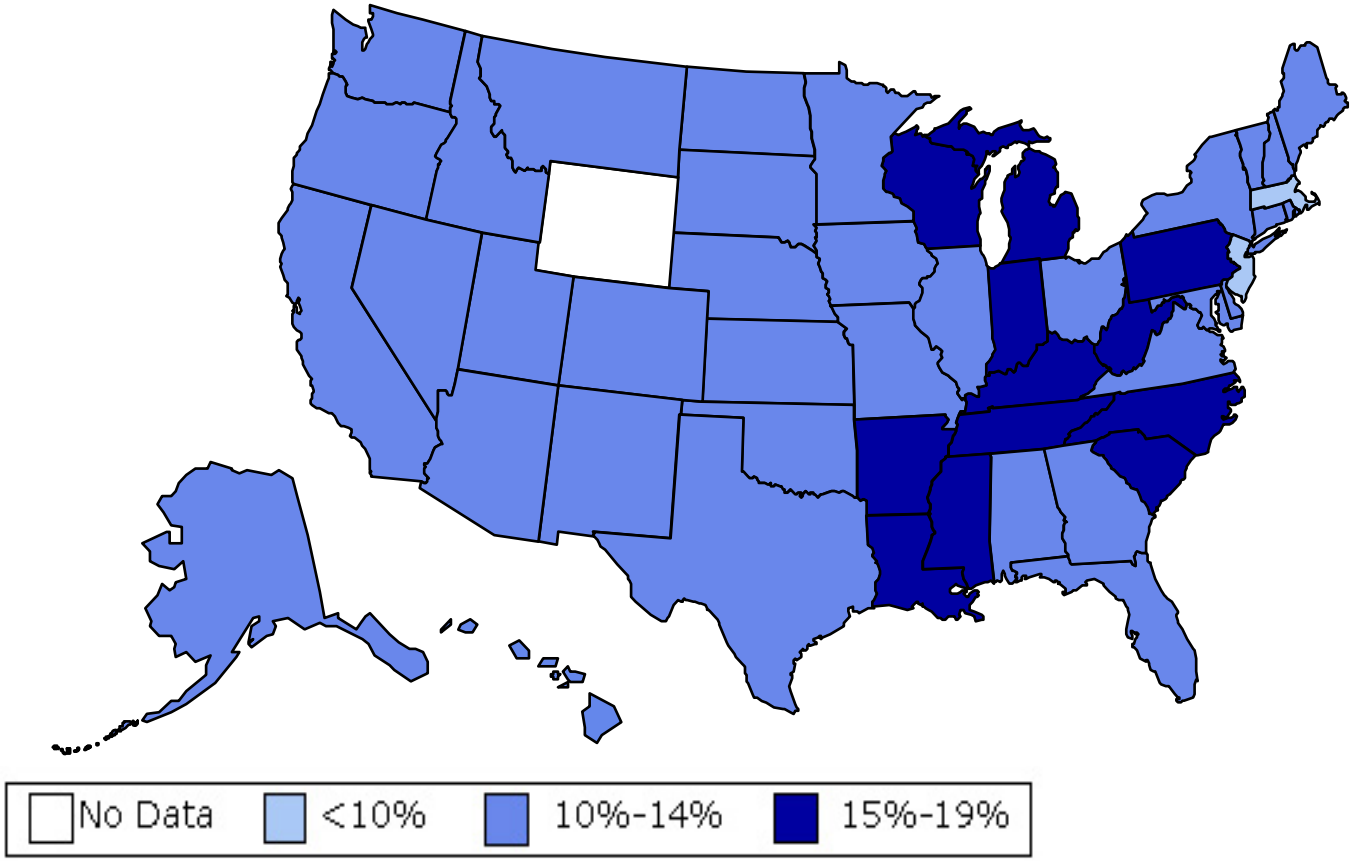

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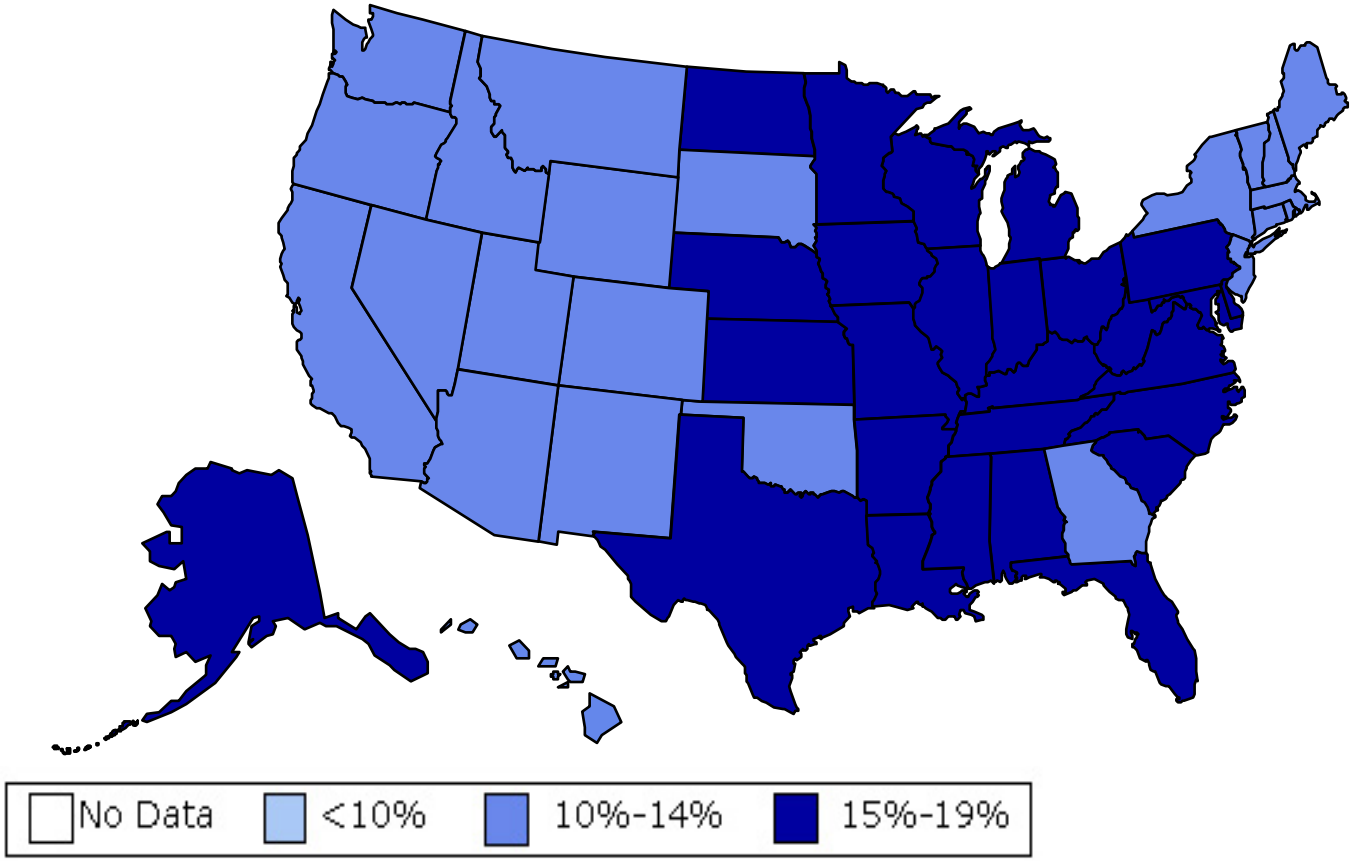

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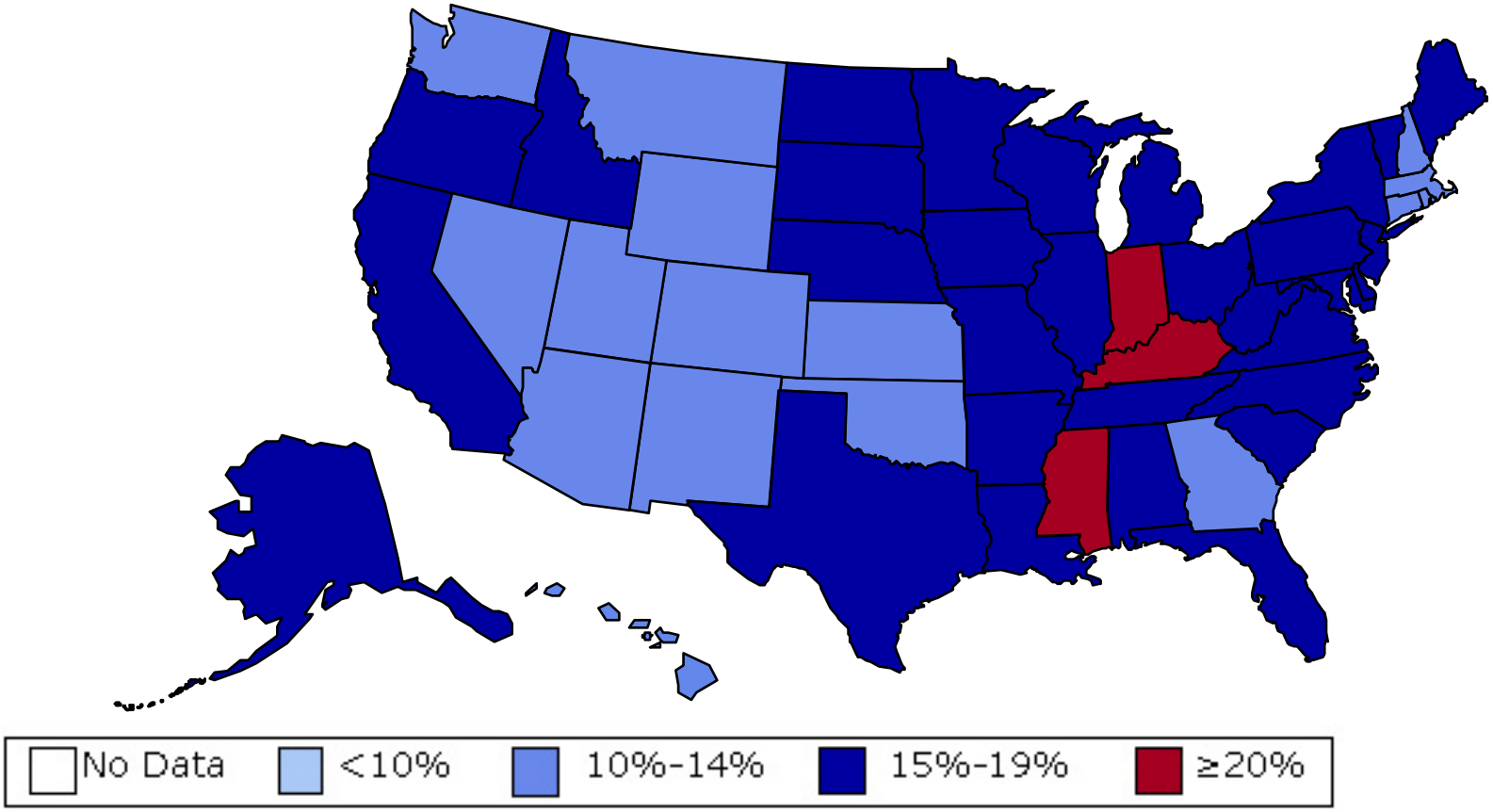

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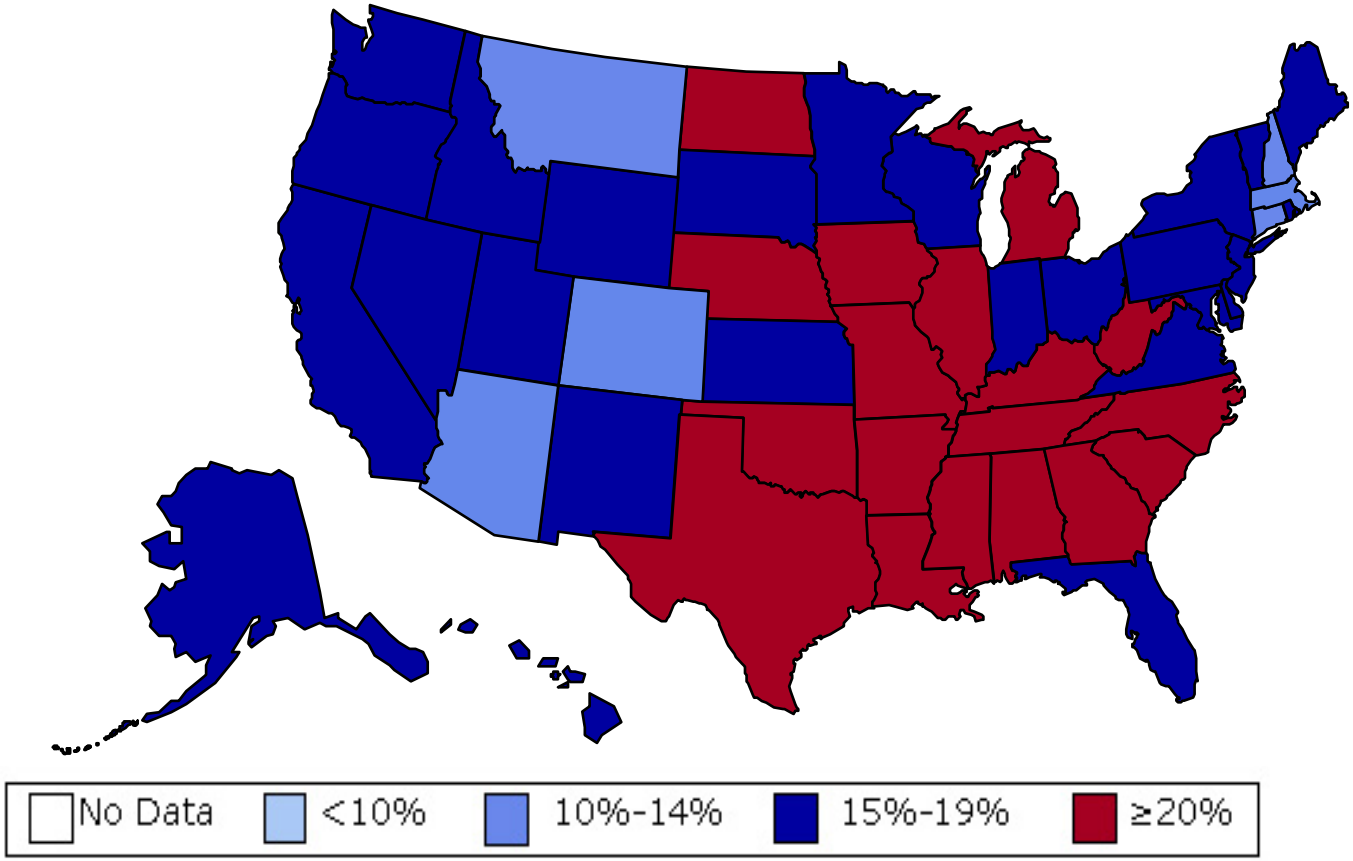

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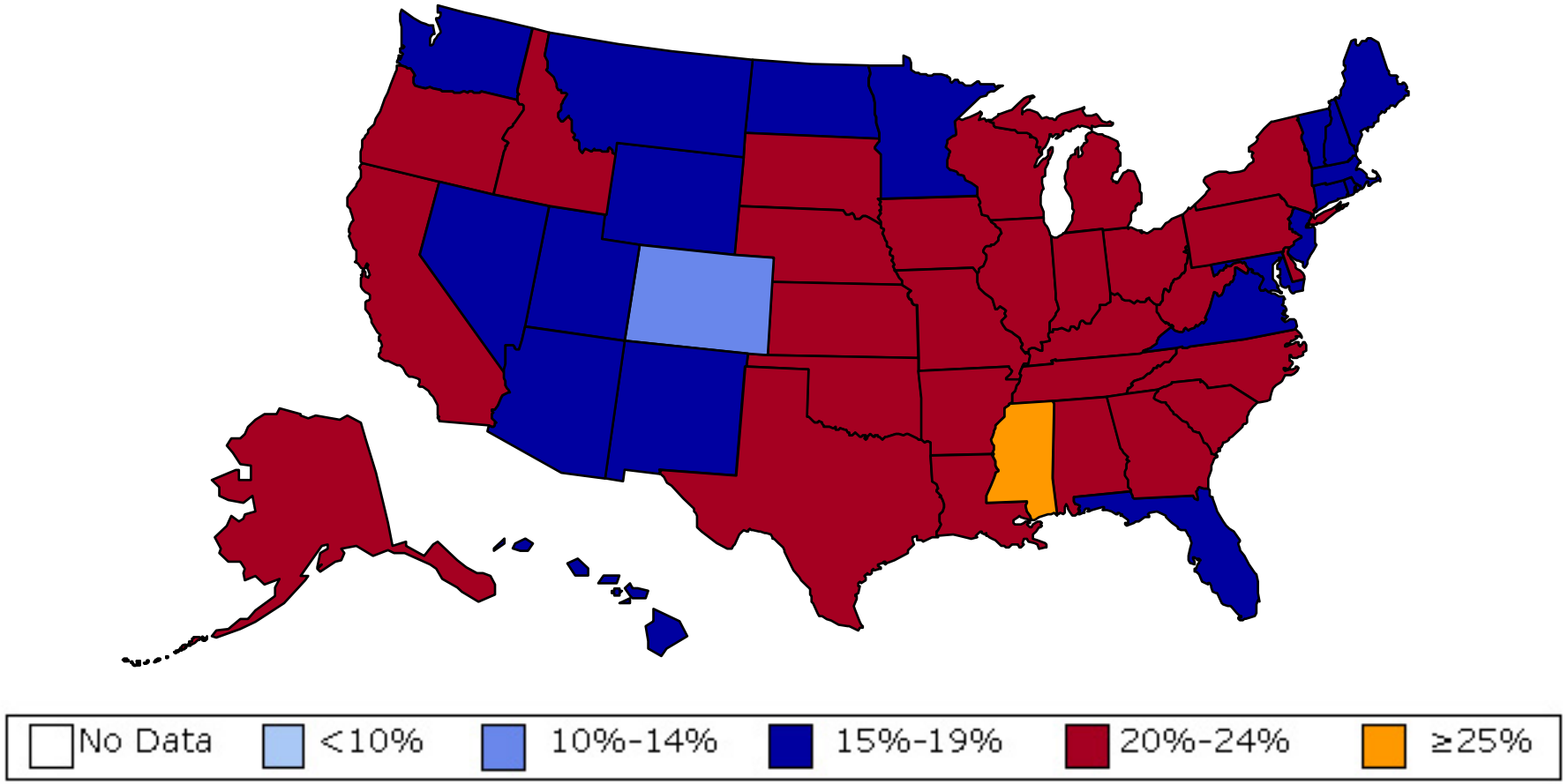


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.

Average 11-year-old boy today is 11 pounds heavier than in 1973

International Agency for Research on Cancer (IARC)

Centre International de Recherche sur le Cancer (CIRC)

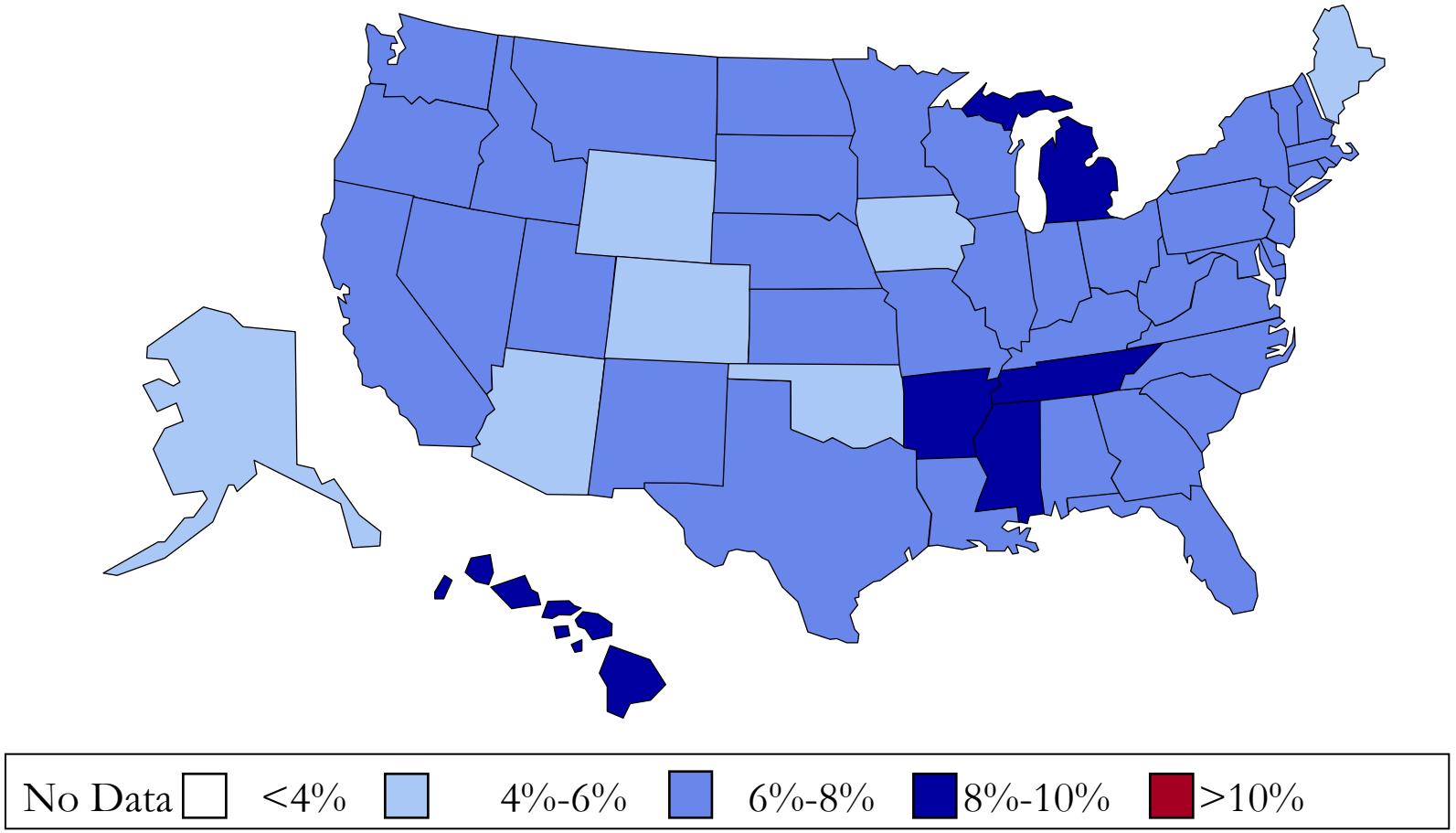
1/3 of colon, breast, & kidney cancers can be attributed to overweight & inactivity.

Being overweight & inactive are the most important avoidable causes for these cancers.

Source: **Overweight And Lack Of Exercise Linked To Increased Cancer Risk – A Growing Problem** . International Agency for Research on Cancer, *20 February 2002*

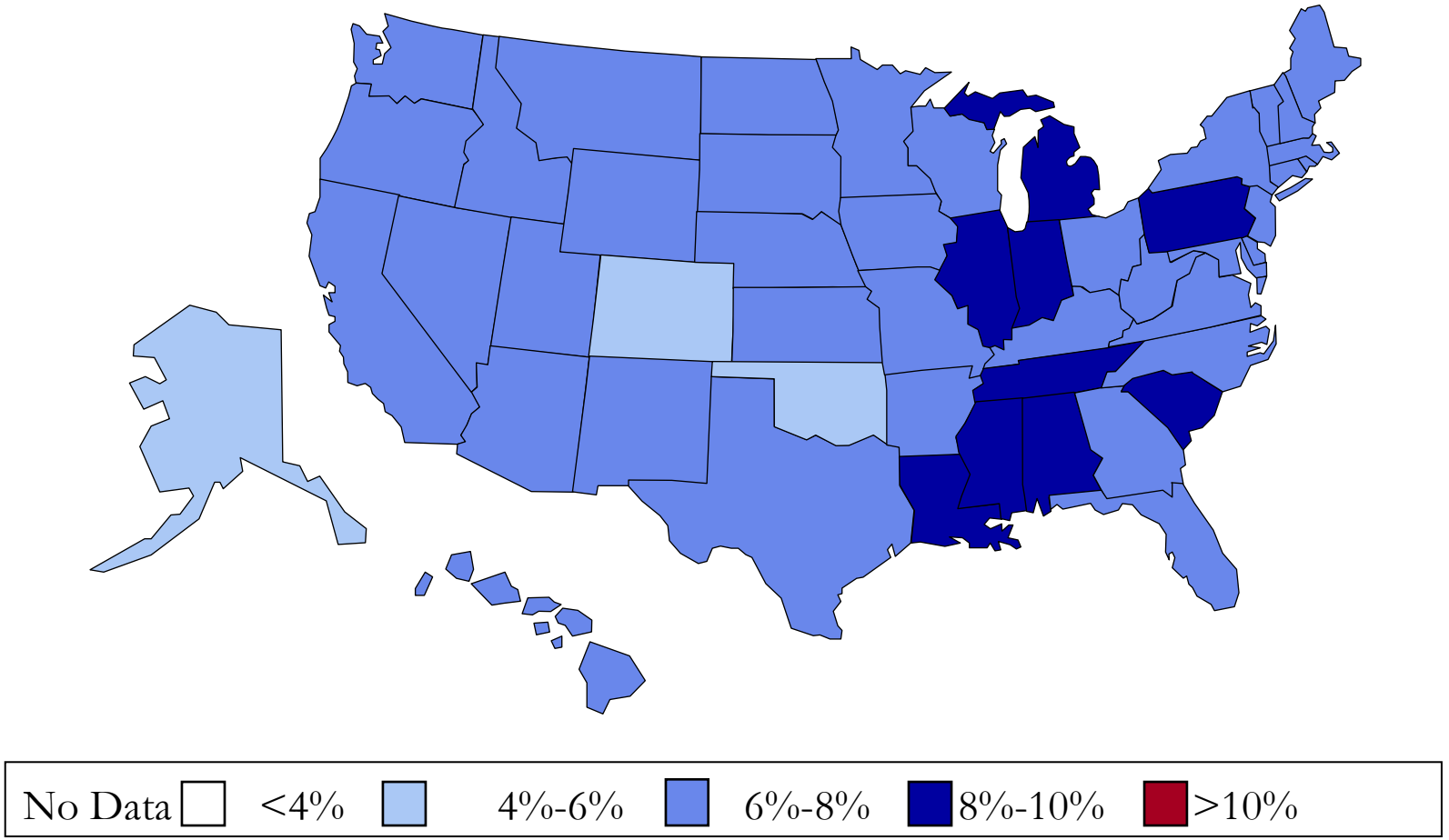

Newsweek
TAX CUT SMACKDOWN
SAINTLY POPES
BEHIND CNBC
September 4, 2000 : $3.50
newsweek.msnbc.com
DIABE
It Strikes 16 Million Americans
Are You at Risk?
Computer drawing of a human insulin molecule
SOCIETY
An American Epidemic
Diabetes
The silent killer: Scientific research shows a 'persistent explosion' of cases—especially among those in their prime
BY JERRY ADLER AND CLAUDIA KALB
SOMETHING TERRIBLE WAS HAPPENING TO YOLANDA BENITEZ'S eyes. They were being poisoned; the fragile capillaries of the retina attacked from within and were leaking blood. The first symptoms were red lines, appearing vertically across her field of vision; the lines multiplied and merged into a haze that shut out light entirely. "Her blood vessels inside her eye were popping," says her daughter, Jannette Roman, a Chicago college student. Benitez, who was in her late 40s when the problem began four years ago, was a cleaning woman, but she's had to stop working. After five surgeries, she has regained vision in one eye, but the other is completely useless. A few weeks ago, awakening one night in a hotel bedroom, she walked into a door, setting off a paroxysm of pain and nausea that hasn't let up yet. And what caused this catastrophe was nothing as exotic as pesticides or emerging viruses. What was poisoning Benitez was sugar.
Diabetes prevalence, by age
1990
1998
12%
10
8
6
4
2
0
18-29
30-39
40-49
50-59
60-69
>70
40 NEWSWEEK SEPTEMBER 4, 2000
Heredity
Genes help determine whether you'll get diabetes. In many families, multiple generations are struck. But heredity is not destiny—especially if you eat well and exercise.
FAMILY PLAGUE: Benitez (left) and Roman. Benitez's mother and two brothers died from complications of the disease.

Diabetes and Gestational Diabetes Trends Among Adults in the U.S., BRFSS 1993-94



Mokdad AH, Ford ES, Bowman BA, et al. Prevalence of obesity, diabetes, and other obesity-related health risk factors, 2001. JAMA 2003 Jan 1;289(1).

Diabetes and Gestational Diabetes Trends Among Adults in the U.S., BRFSS 1995-96



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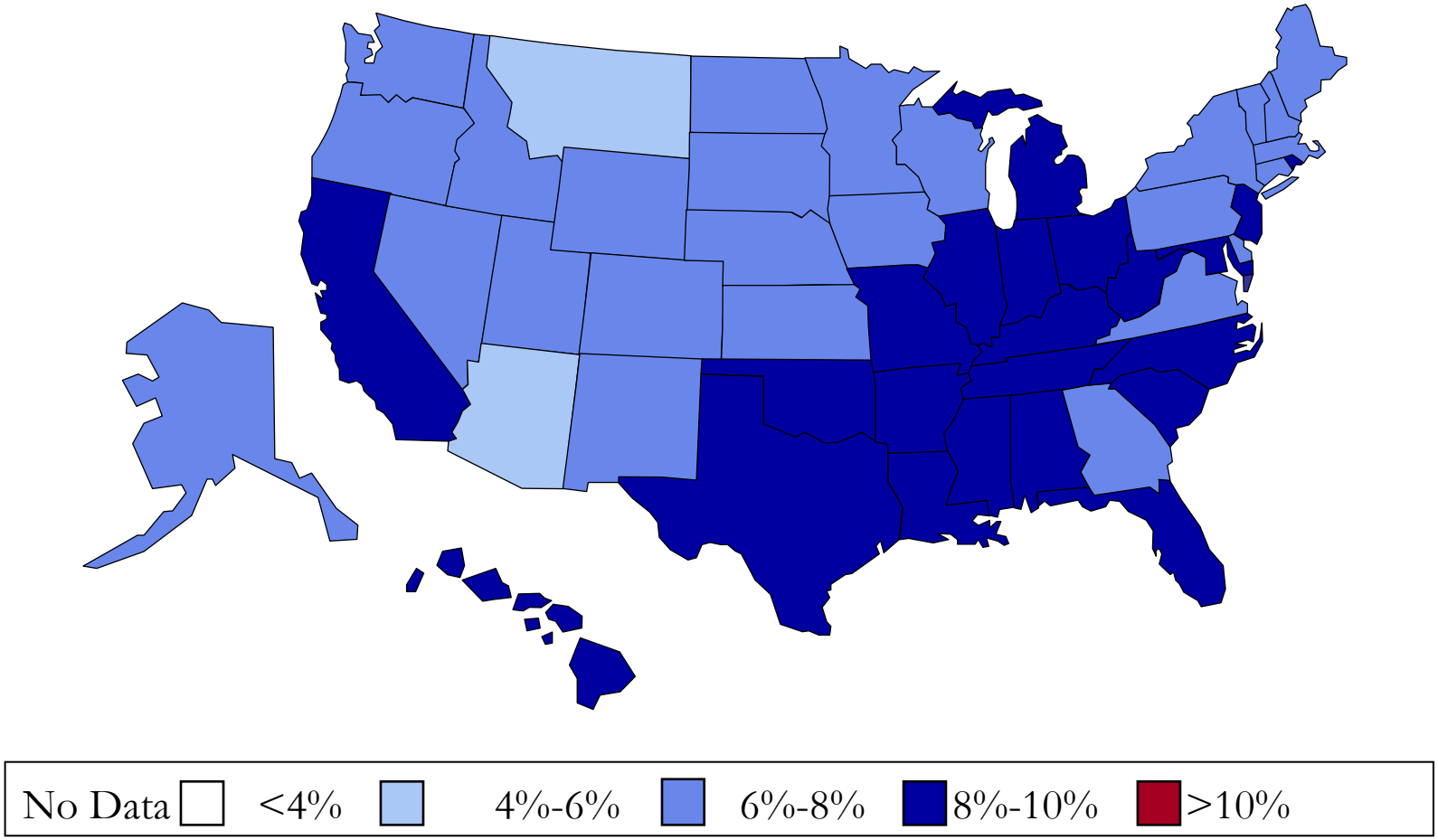
Diabetes and Gestational Diabetes Trends Among Adults in the U.S., BRFSS 1997-98



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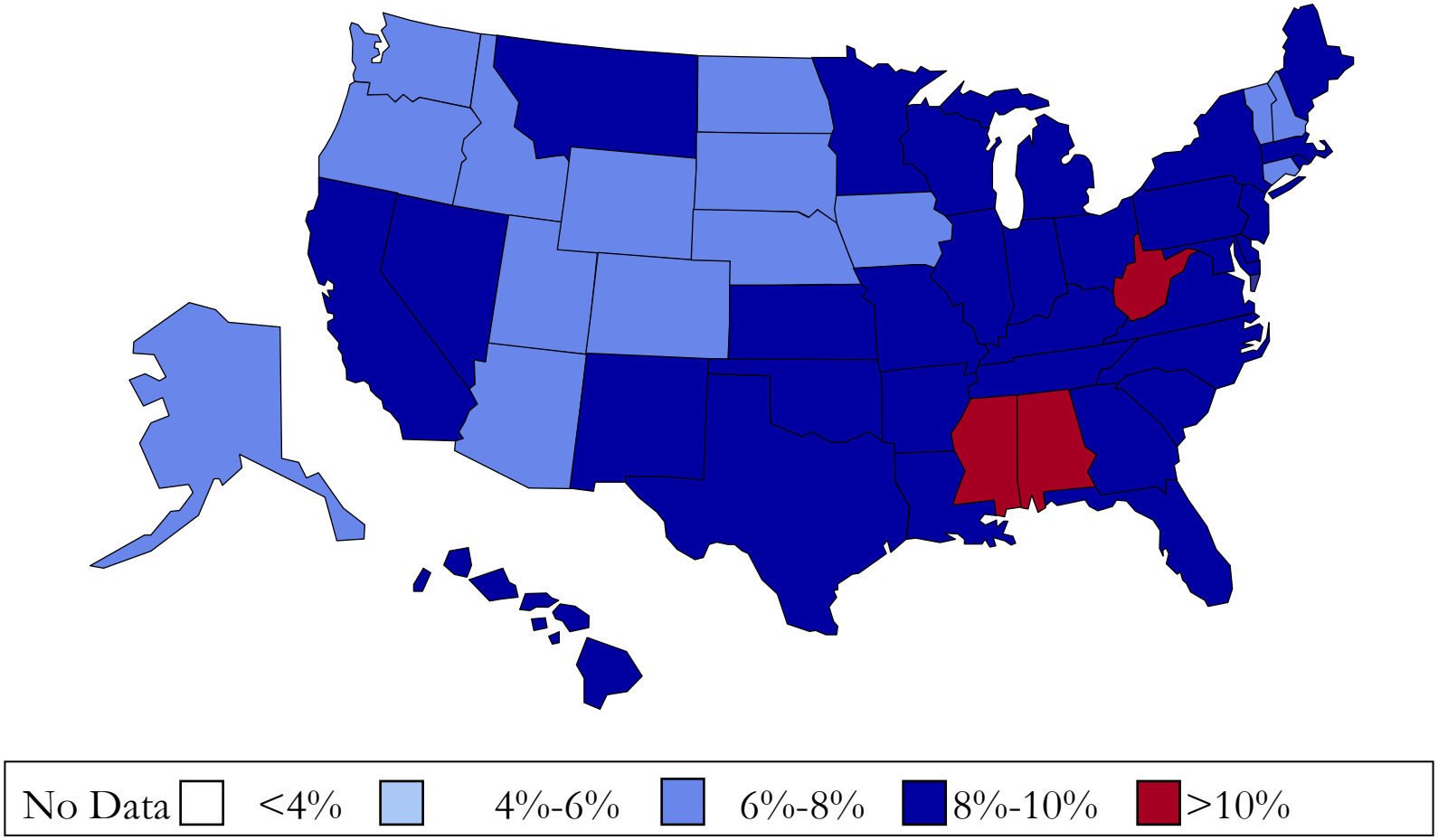

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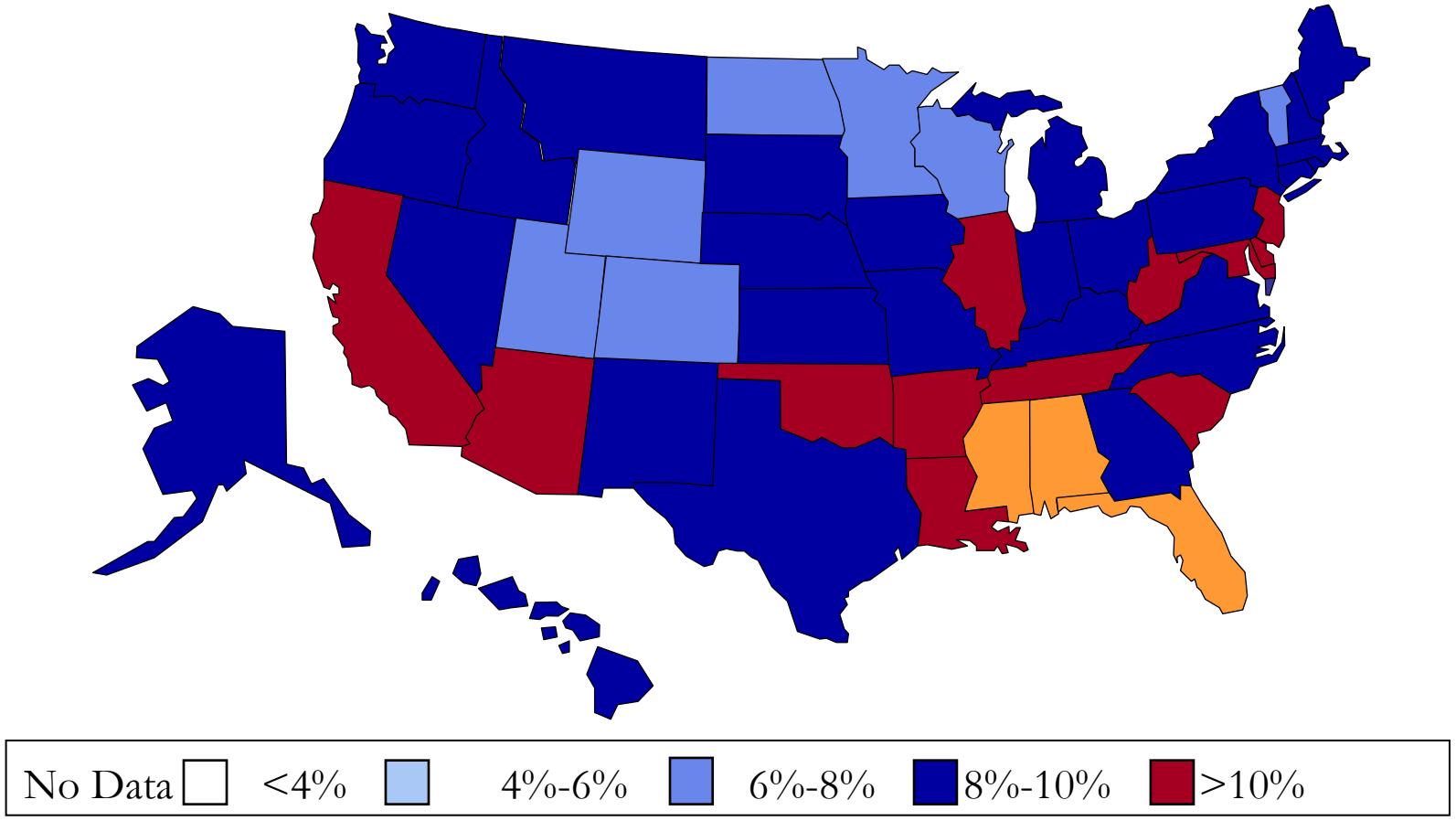

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Diabetes & People born in 2000

Girls: 38% lifetime risk

If diabetic < 40 yrs

Lifespan down 14 yrs

Boys: 33% lifetime risk

If diabetic < 40 yrs

Lifespan down 12 yrs

The Atlanta Journal-Constitution / Sunday, June 15, 2003

CDC: Diabetes to afflict 1 in 3 born in 2000

Scientist says kids must eat healthier, exercise more

By JANET McCONNAUGHEY
Associated Press

New Orleans — One in three U.S. children born in 2000 will become diabetic unless many more people start eating less and exercising more, a scientist with the Centers for Disease Control and Prevention warned Saturday.

The odds are worse for African-American and Latino children: Nearly half of them are likely to develop the disease, said Dr. K.M. Venkat Narayan, a diabetes epidemiologist at the CDC.

"I think the fact that the diabetes epidemic has been raging has been well-known to us for several years. But looking at the risk in these terms was very shocking to us," Narayan said.

The 33 percent lifetime risk is about triple the American Diabetes Association's current estimate.

by 2050, to 29 million, an earlier CDC study by Narayan and others found.

"These estimates I am giving you now are probably quite conservative," Narayan said in an interview before the diabetes association's annual scientific meeting here.

Narayan said it would be difficult to say whether undiagnosed cases would rise at the same rate.

If they did, that could push the 2050 figure to 40 million or more.

Doctors had known for some time that Type 2 diabetes — what used to be called adult-onset diabetes because it typically showed up in middle-aged people — is on the rise, and that patients are getting younger.

Nobody else had crunched the numbers to look at current odds of getting the disease, Narayan said.

Overall, he said, 39 percent of the girls who now are healthy 2½- to 3-year-olds and 33 percent of the boys are likely to develop diabetes, he said.

For Latino children, the odds are closer to one in two: 53 percent of the girls and 45 percent of the boys. The numbers are about 49 percent and 40 percent for African-American girls

Asthma outbreak hits kids

RISKS OF THE 'RED ZONE'

JENNI GIRTMAN /

nson, 2, breathes fresh air Friday as his aunt Susan Thomas tends him at Atlanta's Hughes Spalding Chi
mog readings in metro Atlanta have produced a flare-up of asthma cases, especially among children.

al-Constitution SATURDAY, AUG. 19, 2000

The Atlanta Journal-Constitution

AUG. 19, 2000 SATURDAY

Smothered in smog

JOHN SPINK / Staff

Atlanta looked like Los Angeles on Friday, as heat hovered around 100 and smog hung in the air. This view is southwesterly, from DeKalb-Peachtree Airport.

Fatality proves sad truth: Heat can kill

ORIGINAL CONTRIBUTION

Impact of Changes in Transporta and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma

Michael S. Friedman, MD
Kenneth E. Powell, MD, MPH
Lori Hutwagner, MS
LeRoy M. Graham, MD
W. Gerald Teague, MD

Context Vehicle exhaust is a major source of ozone and other air pollutants. Although high ground-level ozone pollution is associated with transient increases in asthma morbidity, the impact of citywide transportation changes on air quality and childhood asthma has not been studied. The alternative transportation strategy implemented during the 1996 Summer Olympic Games in Atlanta, Ga, provided such an opportunity.

Objective To describe traffic changes in Atlanta, Ga, during the 1996 Summer Olympic Games and concomitant changes in air quality and childhood asthma events.

Design Ecological study comparing the 17 days of the Olympic Games (July 19–August 4, 1996) to a baseline period consisting of the 4 weeks before and 4 weeks after the Olympic Games.

Setting and Subjects Children aged 1 to 16 years who resided in the 5 central counties of metropolitan Atlanta and whose data were captured in 1 of 4 databases.

Main Outcome Measures Citywide acute care visits and hospitalizations for asthma (asthma events) and nonasthma events, concentrations of major air pollutants, meteorological variables, and traffic counts.

Results During the Olympic Games, the number of asthma acute care events decreased 41.6% (4.23 vs 2.47 daily events) in the Georgia Medicaid claims file, 44.1% (1.36 vs 0.76 daily events) in a health maintenance organization database, 11.1% (4.77 vs 4.24 daily events) in 2 pediatric emergency departments, and 19.1% (2.04 vs 1.65 daily hospitalizations) in the Georgia Hospital Discharge Database. The number of nonasthma acute care events in the 4 databases changed −3.1%, +1.3%, −2.1%, and +1.0%, respectively. In multivariate regression analysis, only the reduction in asthma events recorded in the Medicaid database was significant (relative risk, 0.48; 95% confidence interval, 0.44-0.86). Peak daily ozone concentrations decreased 27.9%, from 81.3 ppb during the baseline period to 58.6 ppb during the Olympic Games ($P<.001$). Peak weekday morning traffic counts dropped 22.5% ($P<.001$). Traffic counts were significantly correlated with that day's peak ozone concentration (average $r=0.36$ for all 4 roads examined). Meteorological conditions during the Olympic Games did not differ substantially from the baseline period.

Conclusions Efforts to reduce downtown traffic congestion in Atlanta during the Olympic Games resulted in decreased traffic density, especially during the critical morning period. This was associated with a prolonged reduction in ozone pollution and significantly lower rates of childhood asthma events. These data provide support for efforts to reduce air pollution and improve health via reductions in motor vehicle traffic.

JAMA. 2001;285:897-905 www.jama.com

DESPITE ADVANCES IN ASTHMA therapy, asthma remains a substantial public health problem. In the United States, asthma is a leading cause of childhood morbidity, with an estimated prevalence of 6.9% in children and youth younger than 18 years.[1] Numerous studies have documented a rise in the morbidity, mortality, and prevalence of asthma in different populations.[2-8] The cause or causes of this trend remain controversial.[9-11]

Experimental, laboratory, and epidemiologic studies in the last several years have linked high concentrations of known air pollutants to respiratory health problems, most notably exacerbations of asthma.[12-23] However, opportunities to study the health effects of anthropogenic improvements in air quality are rare. One study found a decrease in particulate pollution and respiratory hospital admissions associated with the closure of an industrial factory in that community.[24] To our knowledge, no study has examined the impact of improved ozone pollution for an extended period of time on asthma exacerbations or other markers of asthma morbidity. Also, the extent to which moderate concentrations of ozone (ie, daily peak of 50-100 ppb) during various exposure lengths affects asthma morbidity remains controversial.[12-16]

Author Affiliations are listed at the end of this article.
Corresponding Author and Reprints: Michael S. Friedman, MD, Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, GA 30333 (e-mail: mff7@cdc.gov).

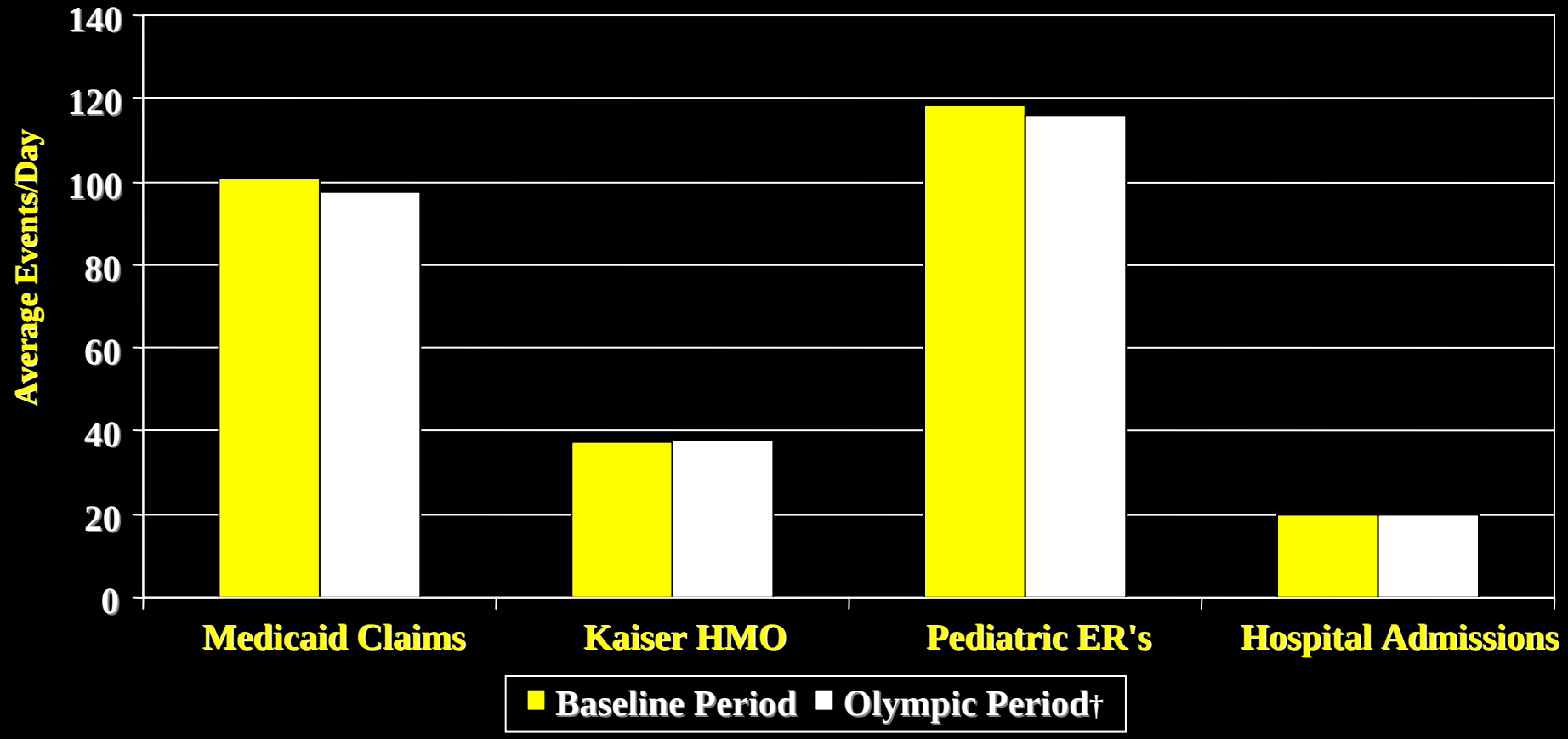
30% reduction in driving

30% improvement in

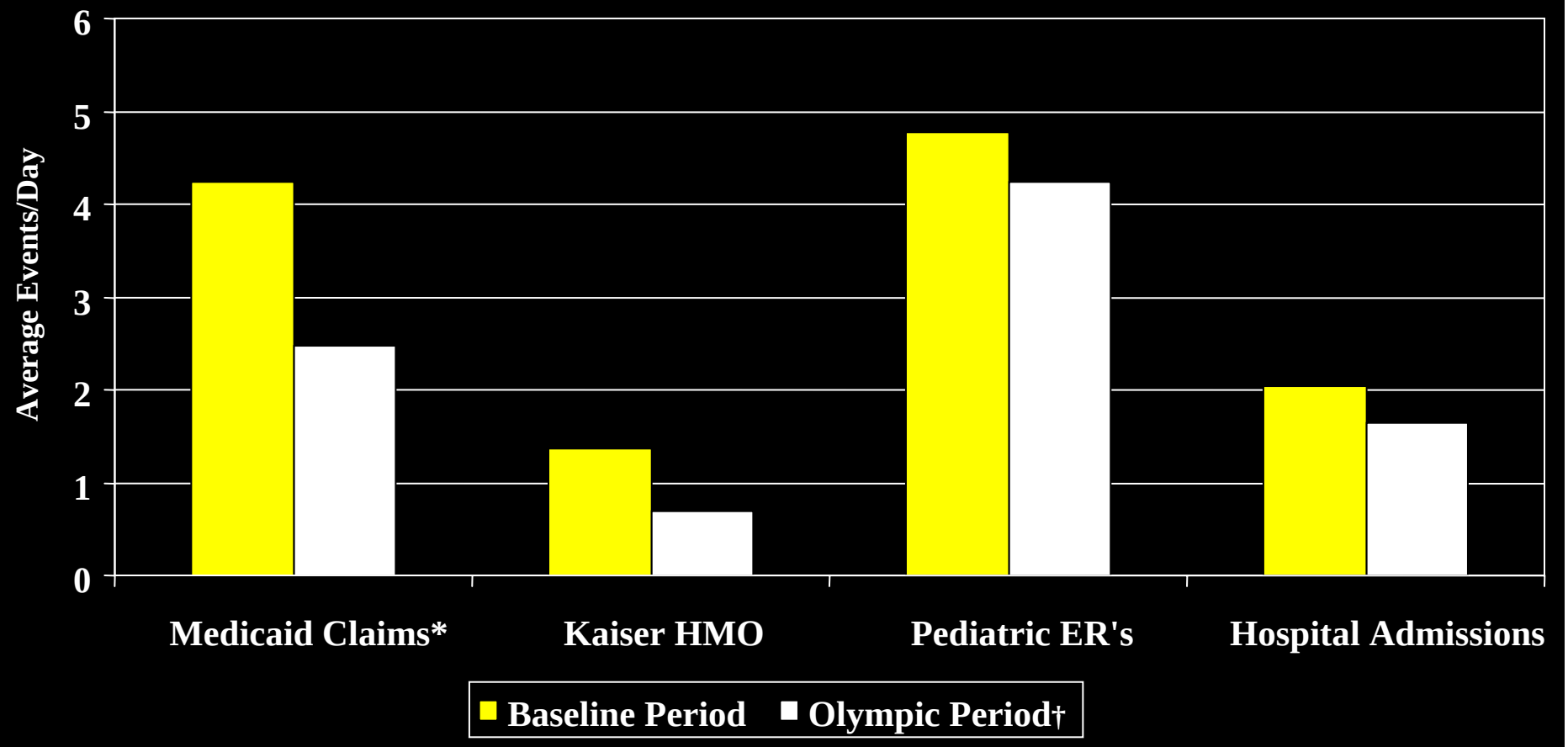
air quality

Total Non-Asthma-Related Acute Care Visits

1-16 year old residents of Atlanta

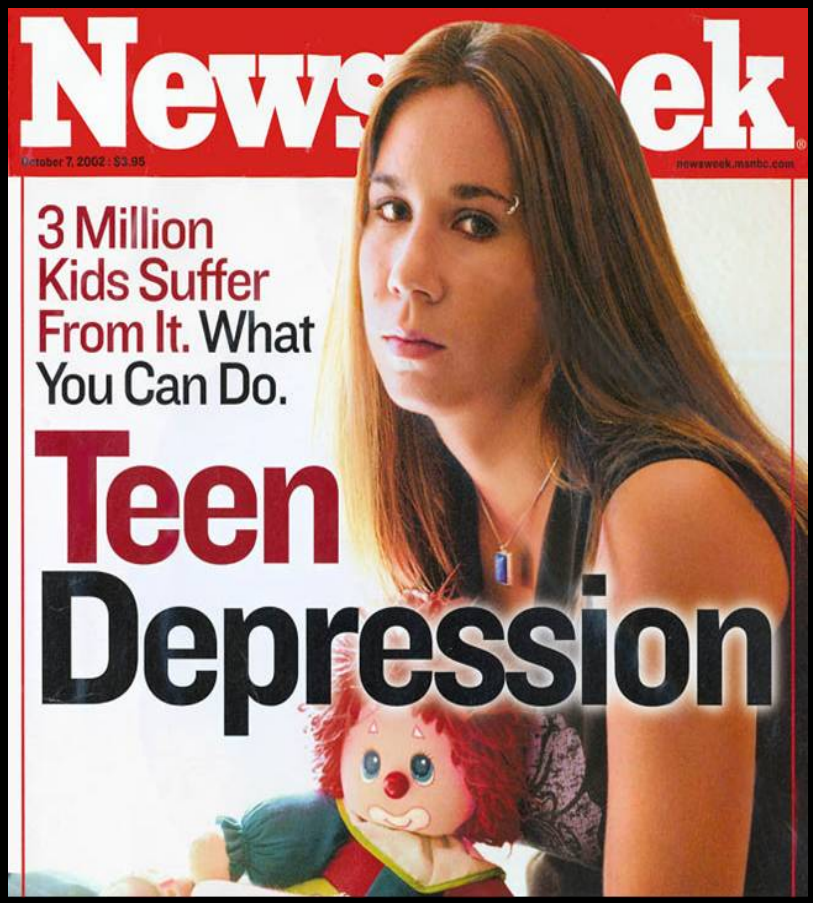


Acute Care Visits for Asthma
1-16 year old residents of Atlanta

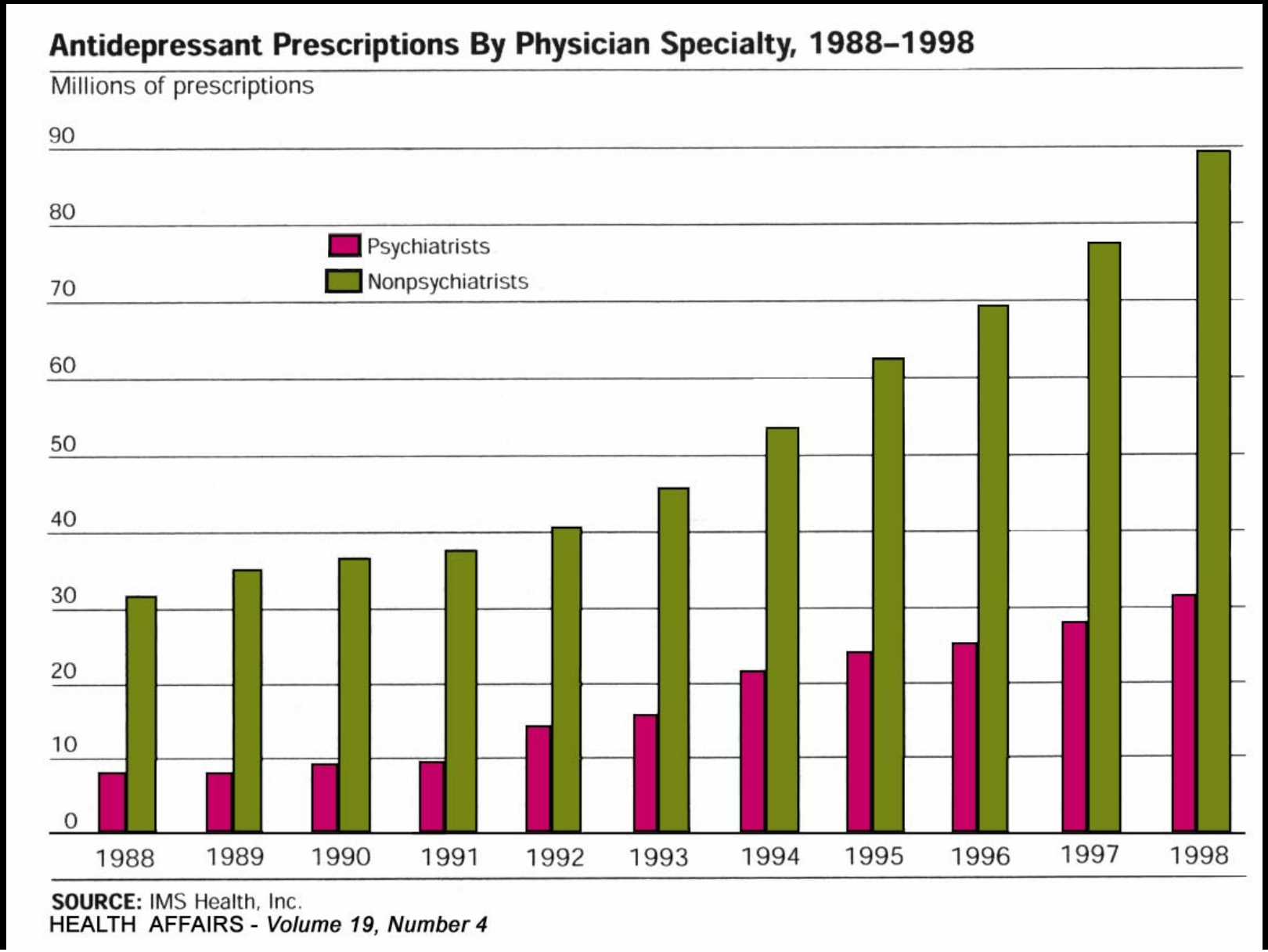


Surgeon General's Report

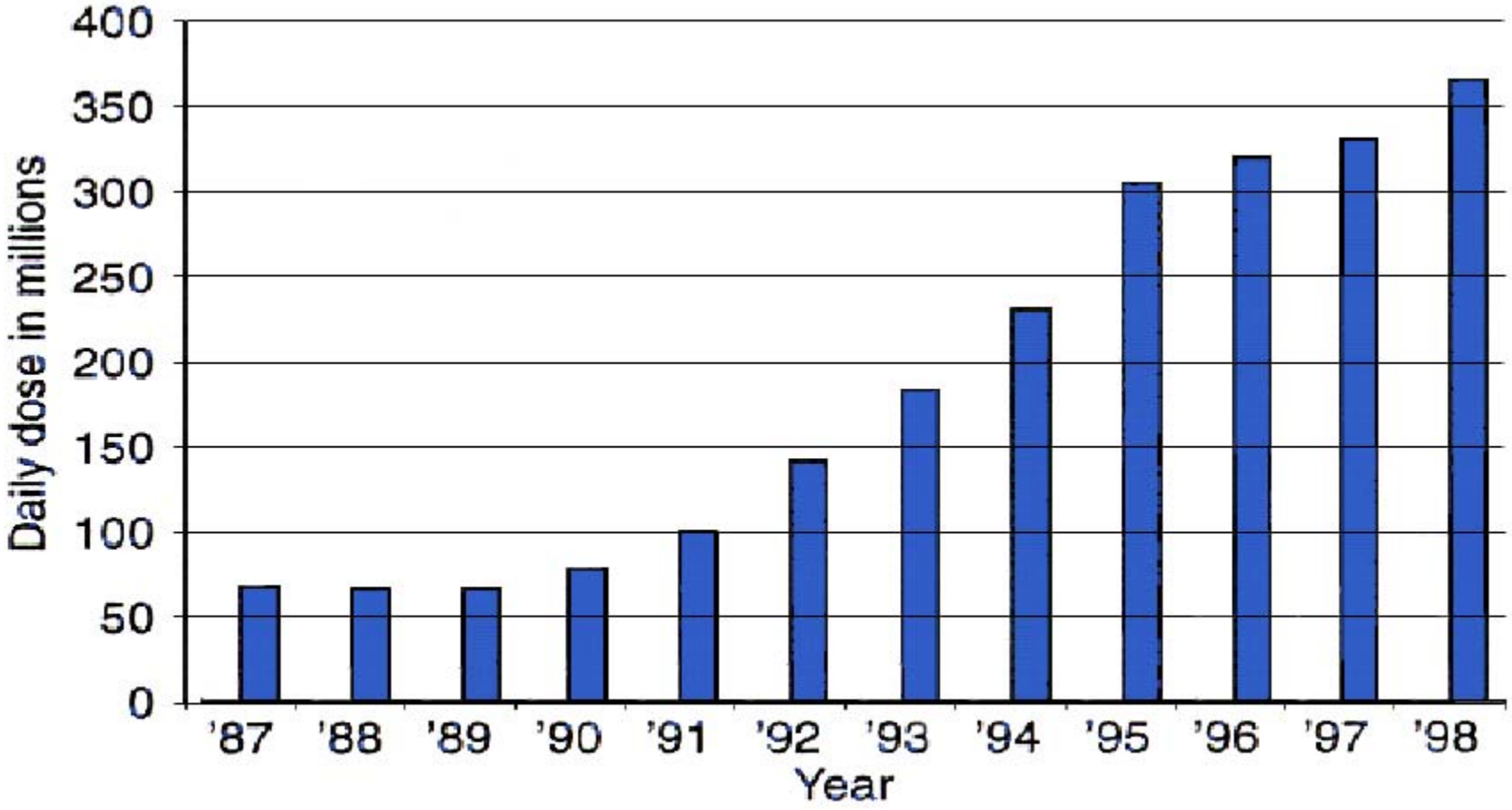
21% US citizens ages 9-17 have a diagnosable mental or addictive disorder associated with at least minimum impairment



Antidepressant Rx in USA



Methylphenidate (Ritalin) Consumption

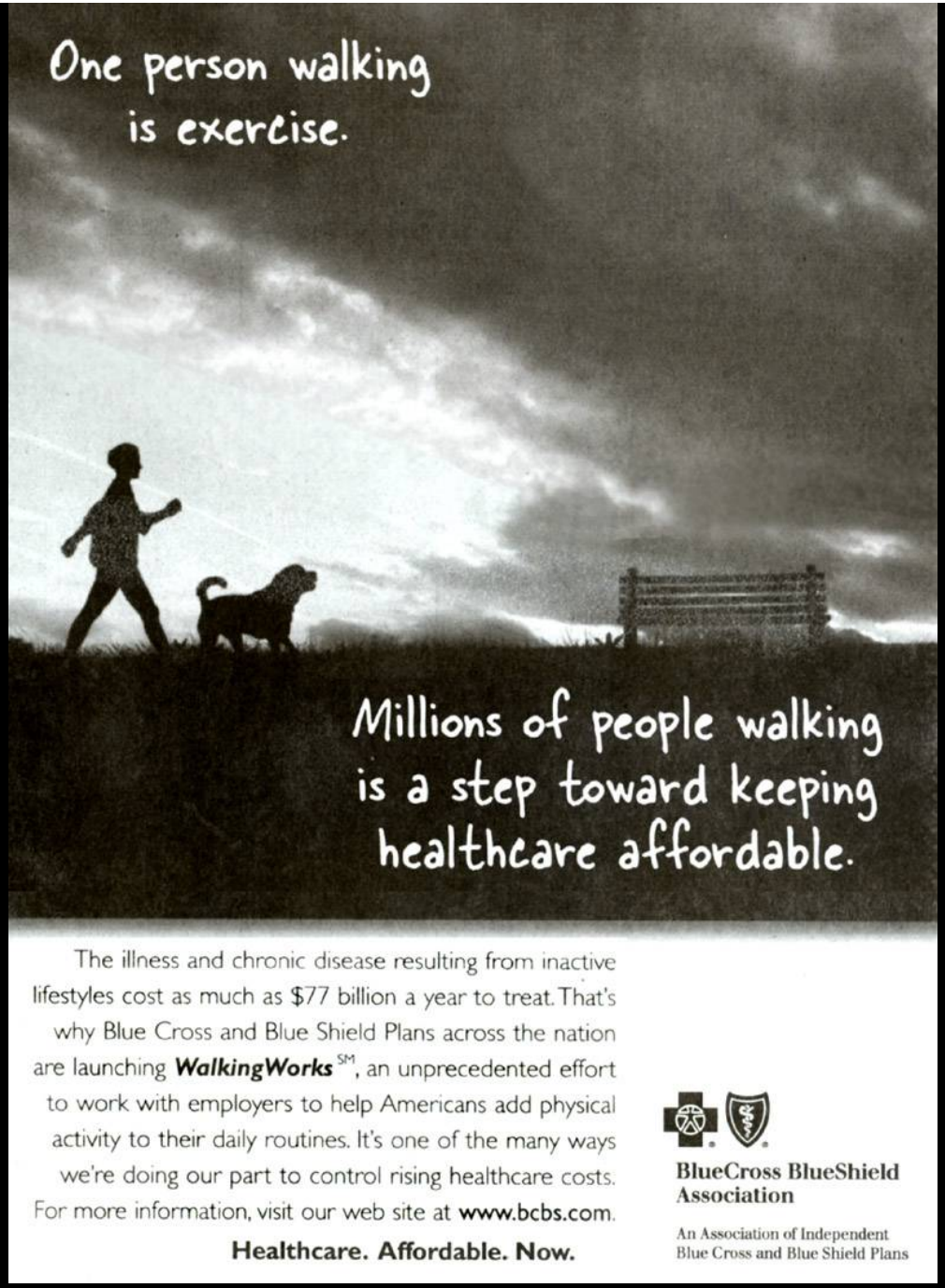


Source: *Science*, Vol. 289, 4 August 2000, p.721.

Depressive Disorders

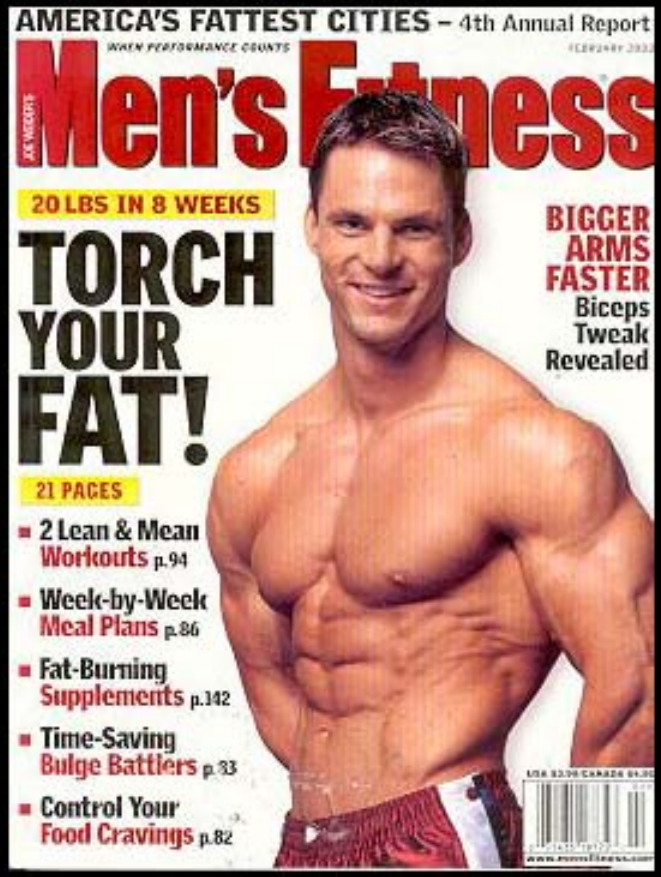
19 million American adults

- **Leading cause of disability in the USA**
- **Treatment:**
  - **Medication**
  - **Social Contact, including therapy**
  - **And…..**



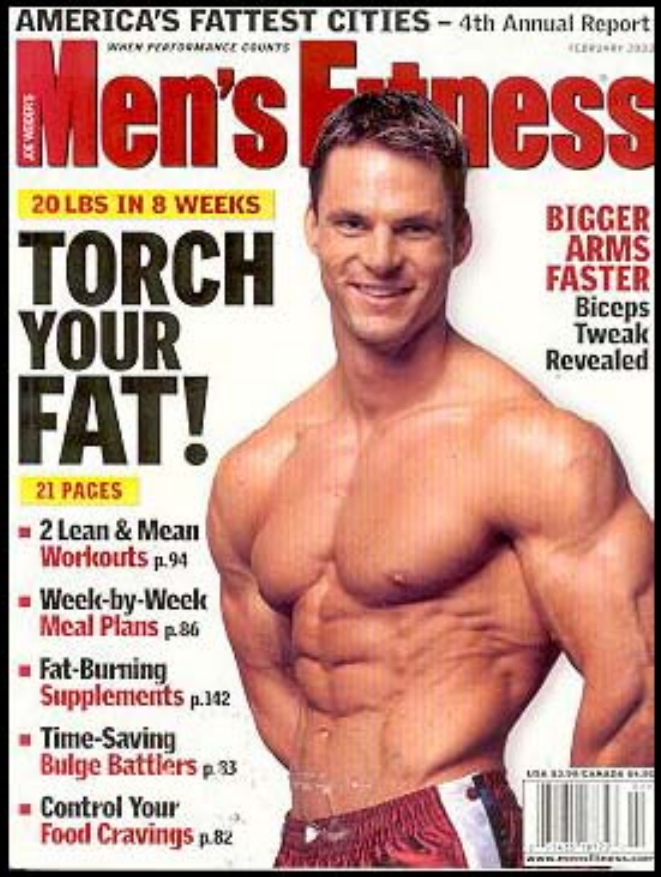
Exercise

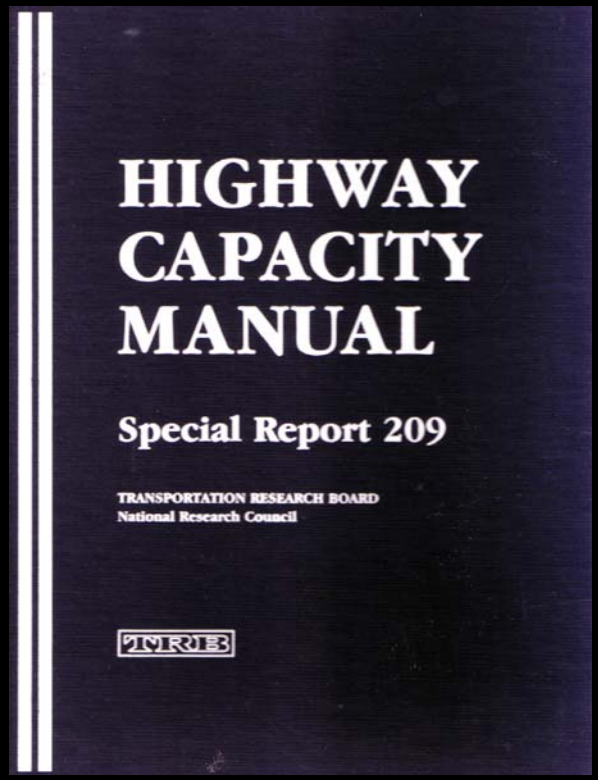
Walk


AMERICA'S FATTEST CITIES – 4th Annual Report
WHEN PERFORMANCE COUNTS
Men's Fitness
20 LBS IN 8 WEEKS
TORCH YOUR FAT!
21 PAGES
2 Lean & Mean Workouts p.94
Week-by-Week Meal Plans p.86
Fat-Burning Supplements p.142
Time-Saving Bulge Battlers p.33
Control Your Food Cravings p.82
BIGGER ARMS FASTER
Biceps Tweak Revealed

"It's probably something to do with culture … We're not a walking city…" because Detroit is, "the automobile capital of the world.

Detroit Mayor Kwame Kilpatric

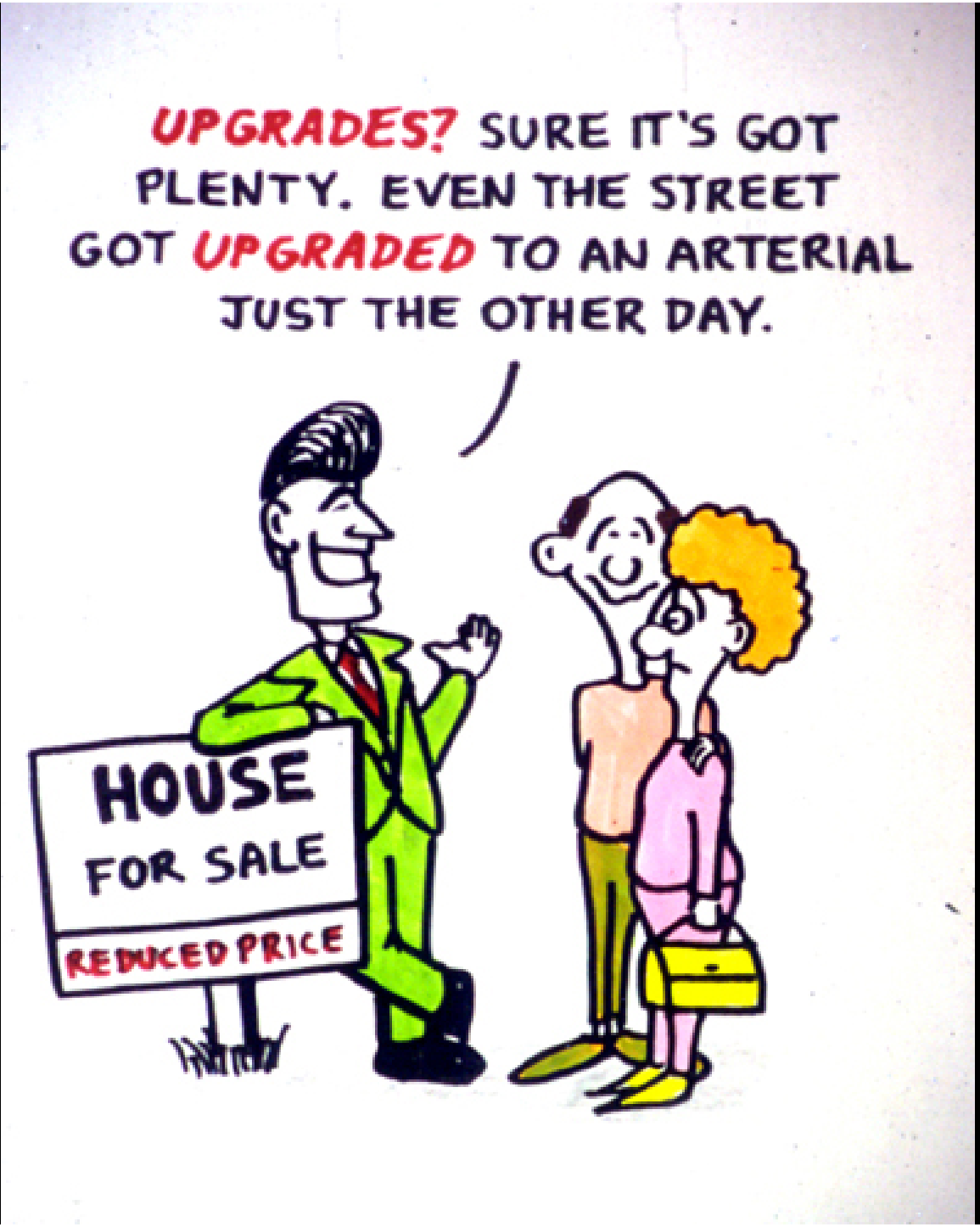


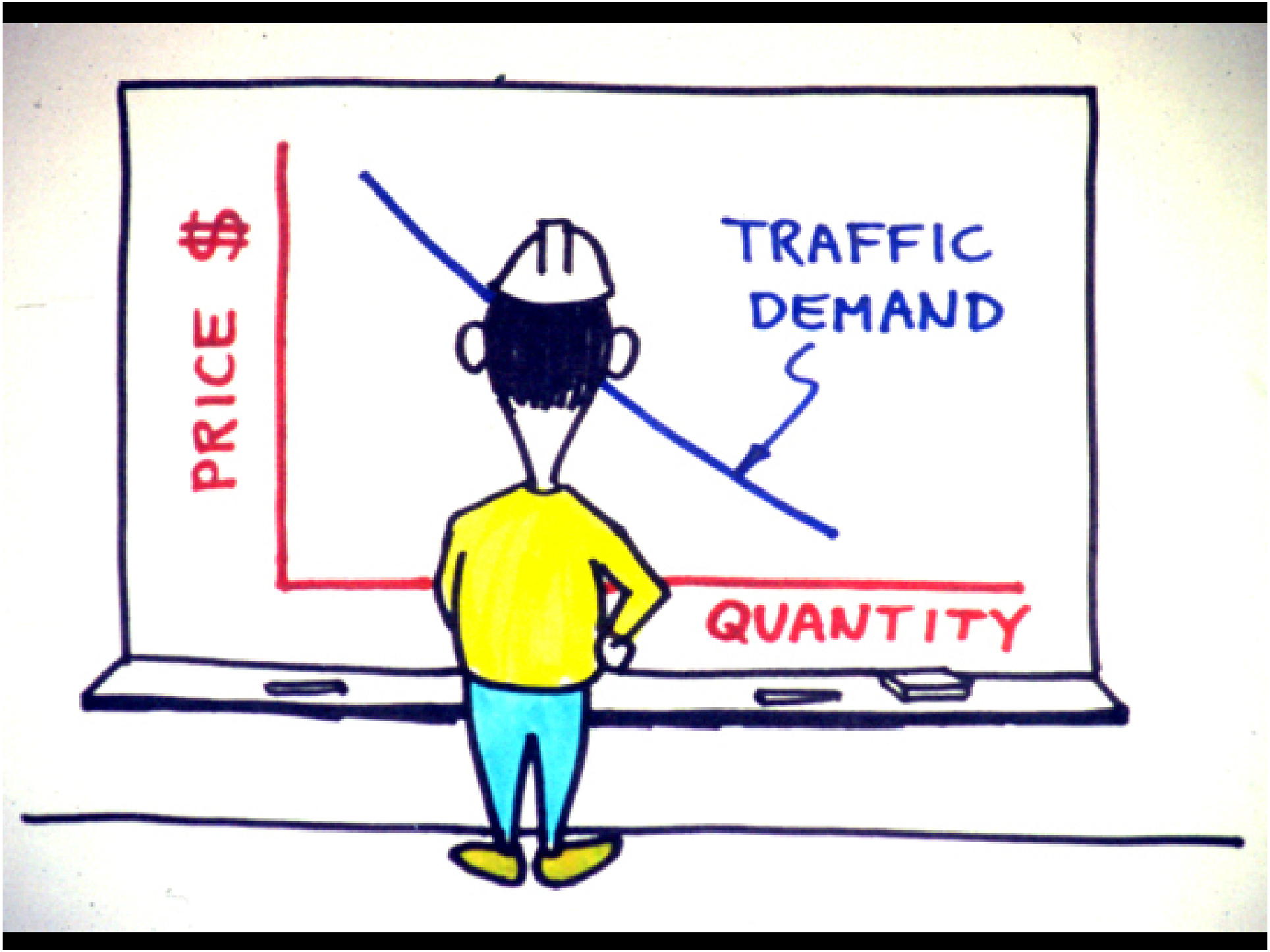

HIGHWAY
CAPACITY
MANUAL
Special Report 209
TRANSPORTATION RESEARCH BOARD
National Research Council
TRB

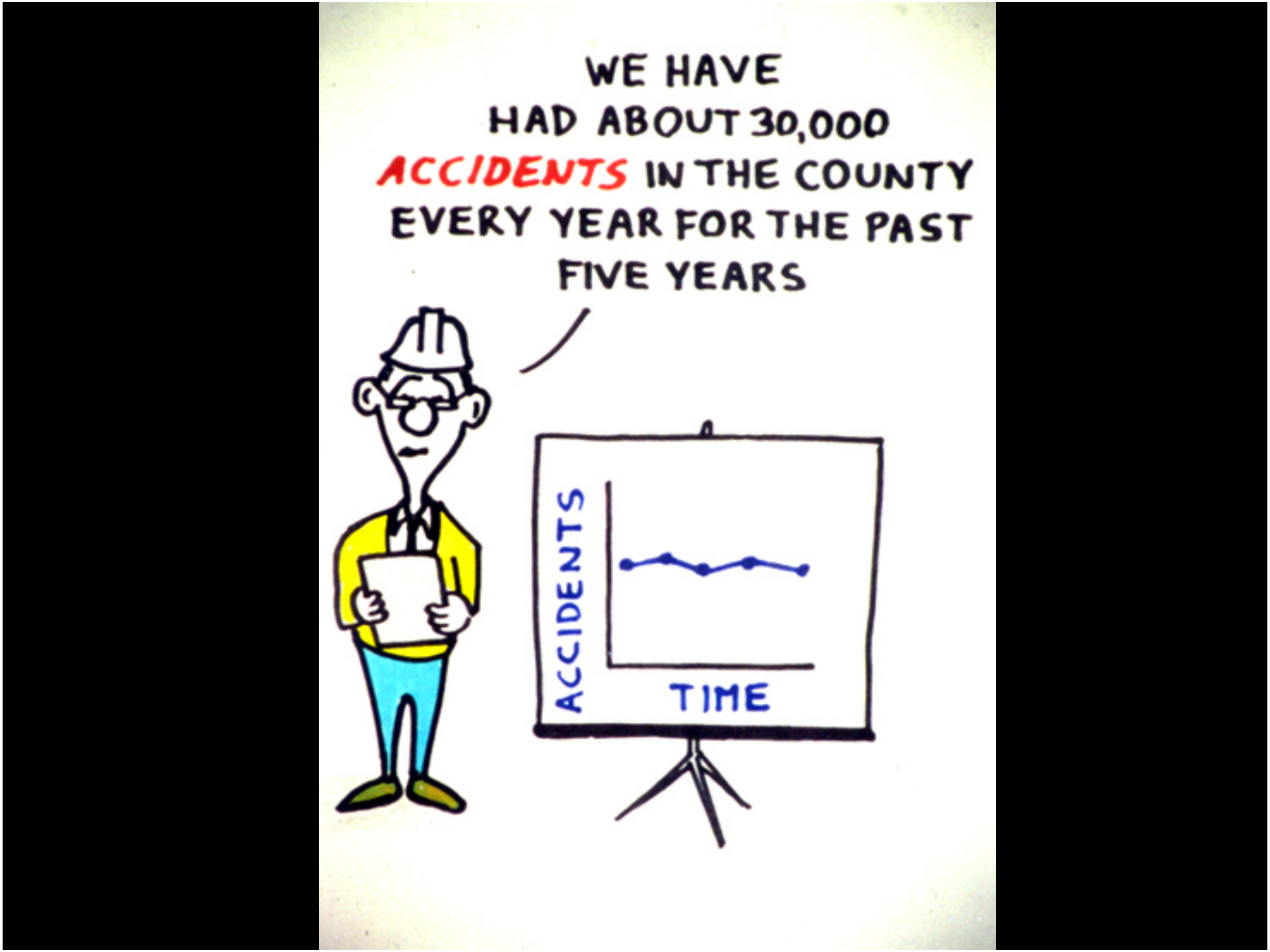
LANGUAGE & THOUGHT

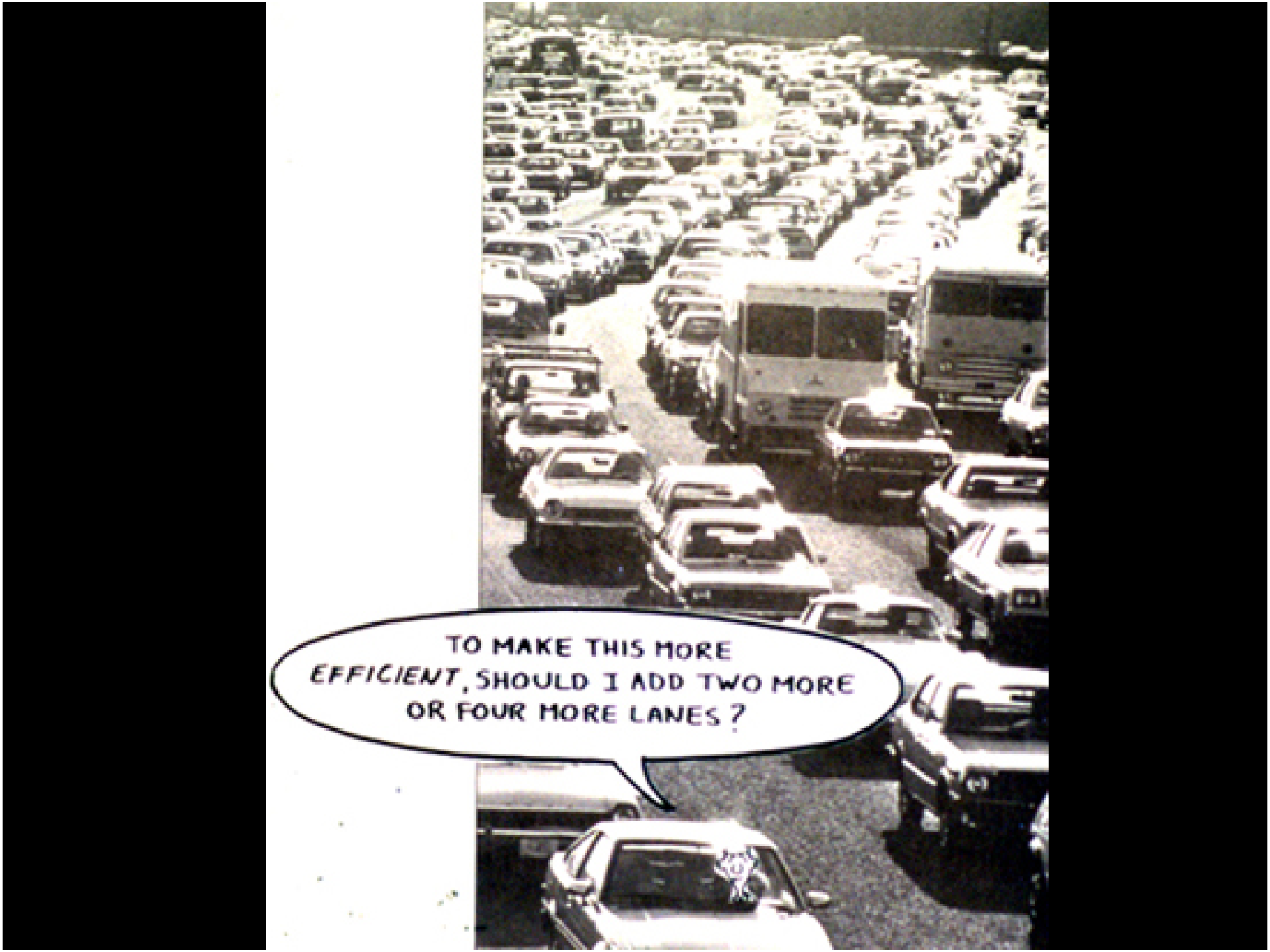
CHOICE OF LANGUAGE
(SHOWING BIAS, CREATING BIAS)


ONCE YOUR STREET IS IMPROVED, THE CURB WILL BE RIGHT HERE

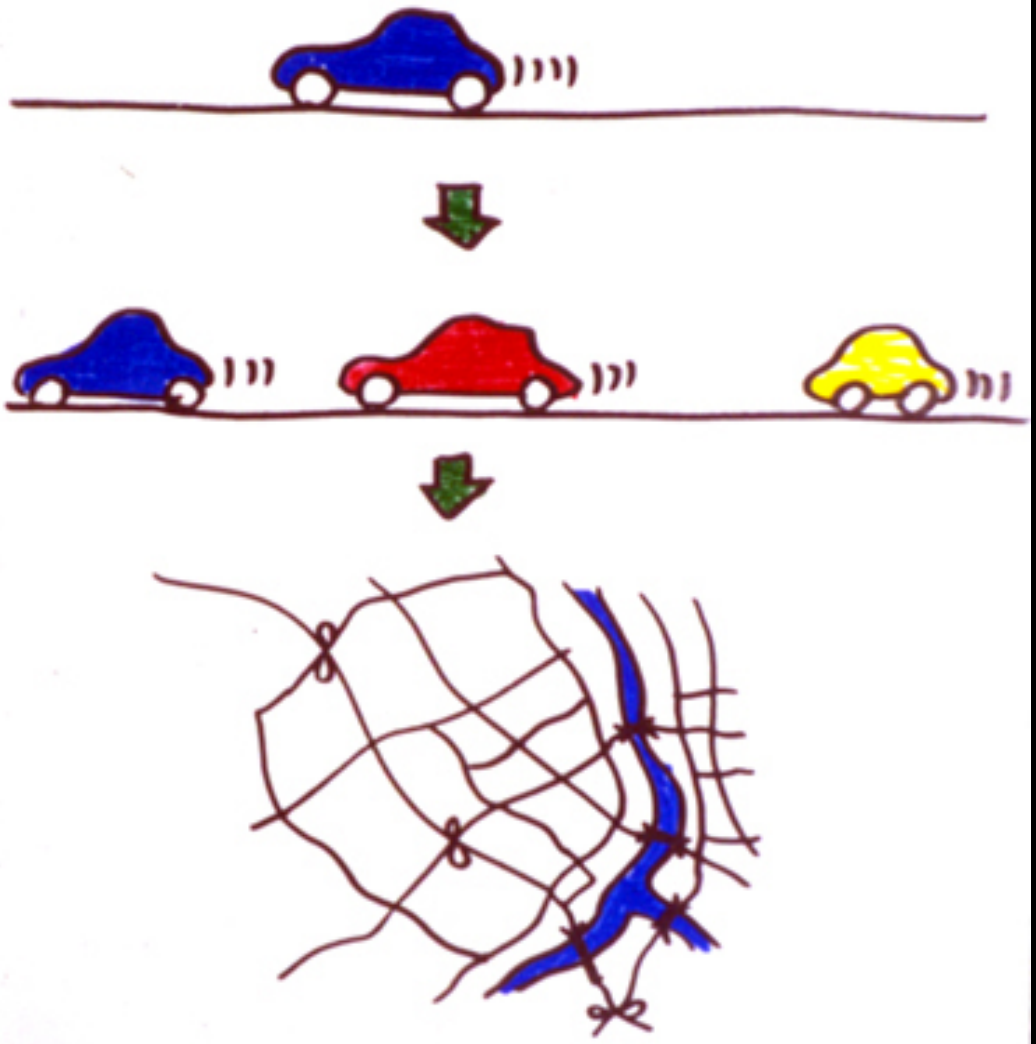

UPGRADES? SURE IT'S GOT PLENTY. EVEN THE STREET GOT UPGRADED TO AN ARTERIAL JUST THE OTHER DAY.
HOUSE
FOR SALE
REDUCED PRICE

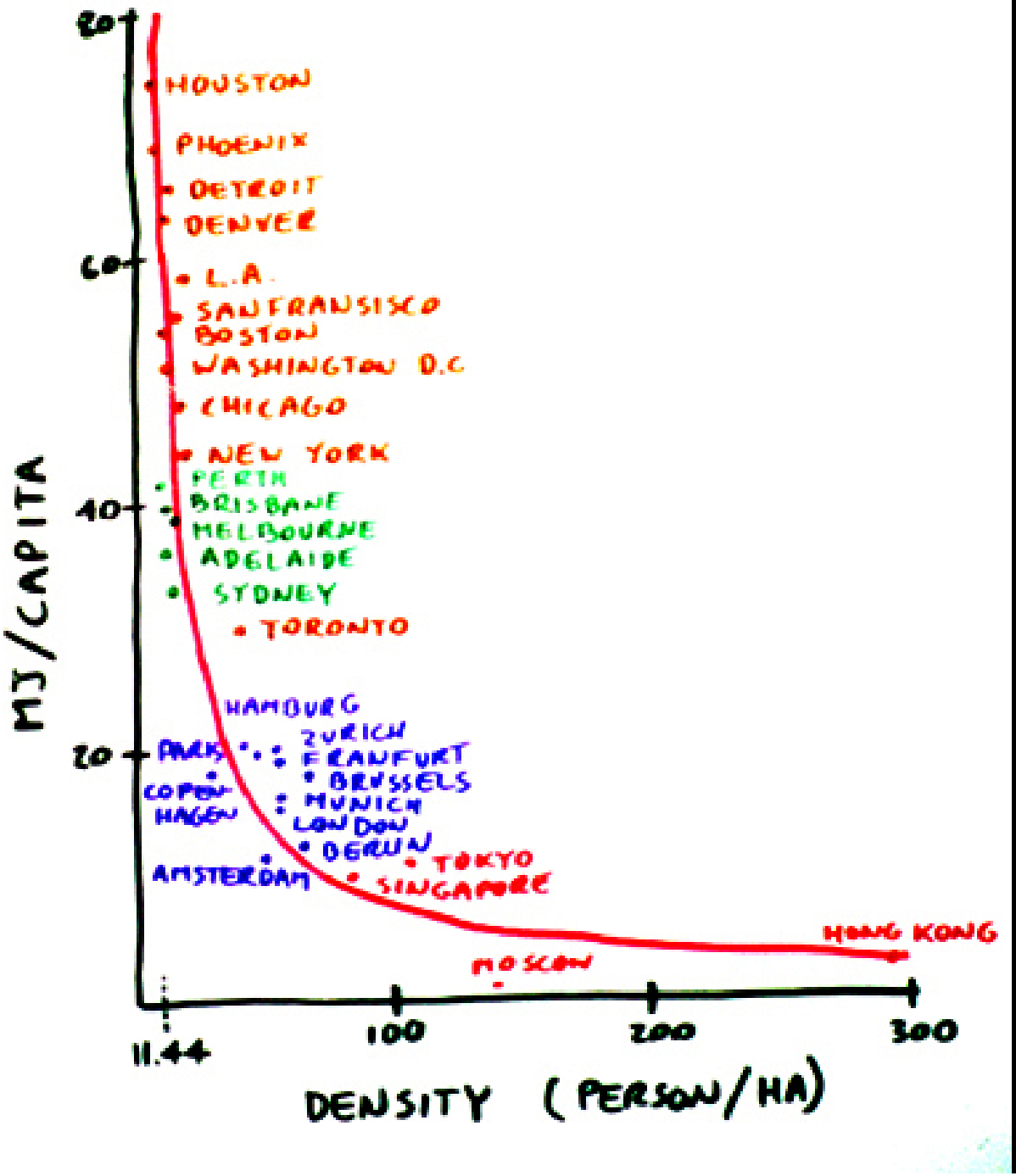

PRICE $
TRAFFIC
DEMAND
QUANTITY

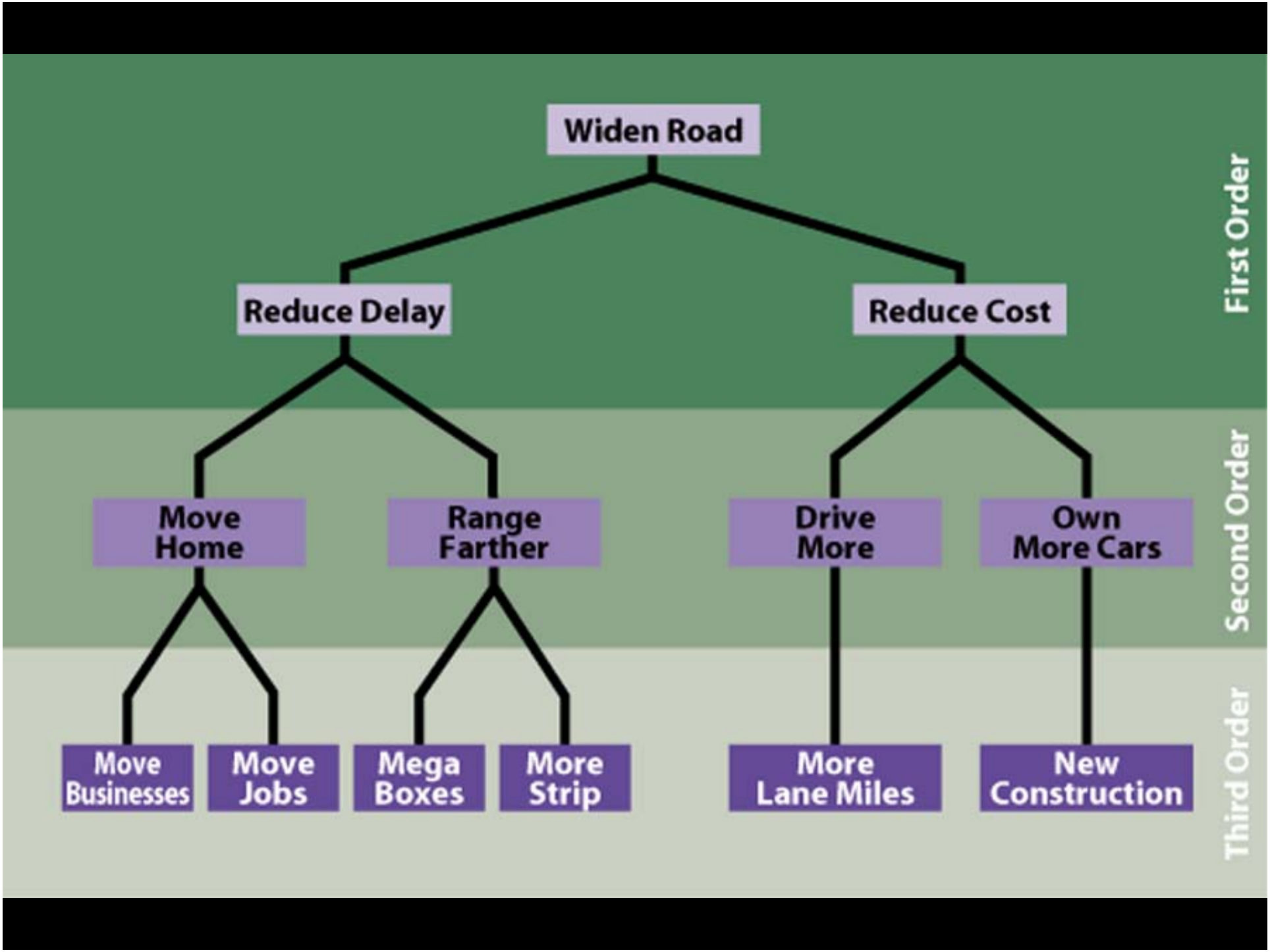

WE HAVE
HAD ABOUT 30,000
ACCIDENTS IN THE COUNTY
EVERY YEAR FOR THE PAST
FIVE YEARS
ACCIDENTS
TIME

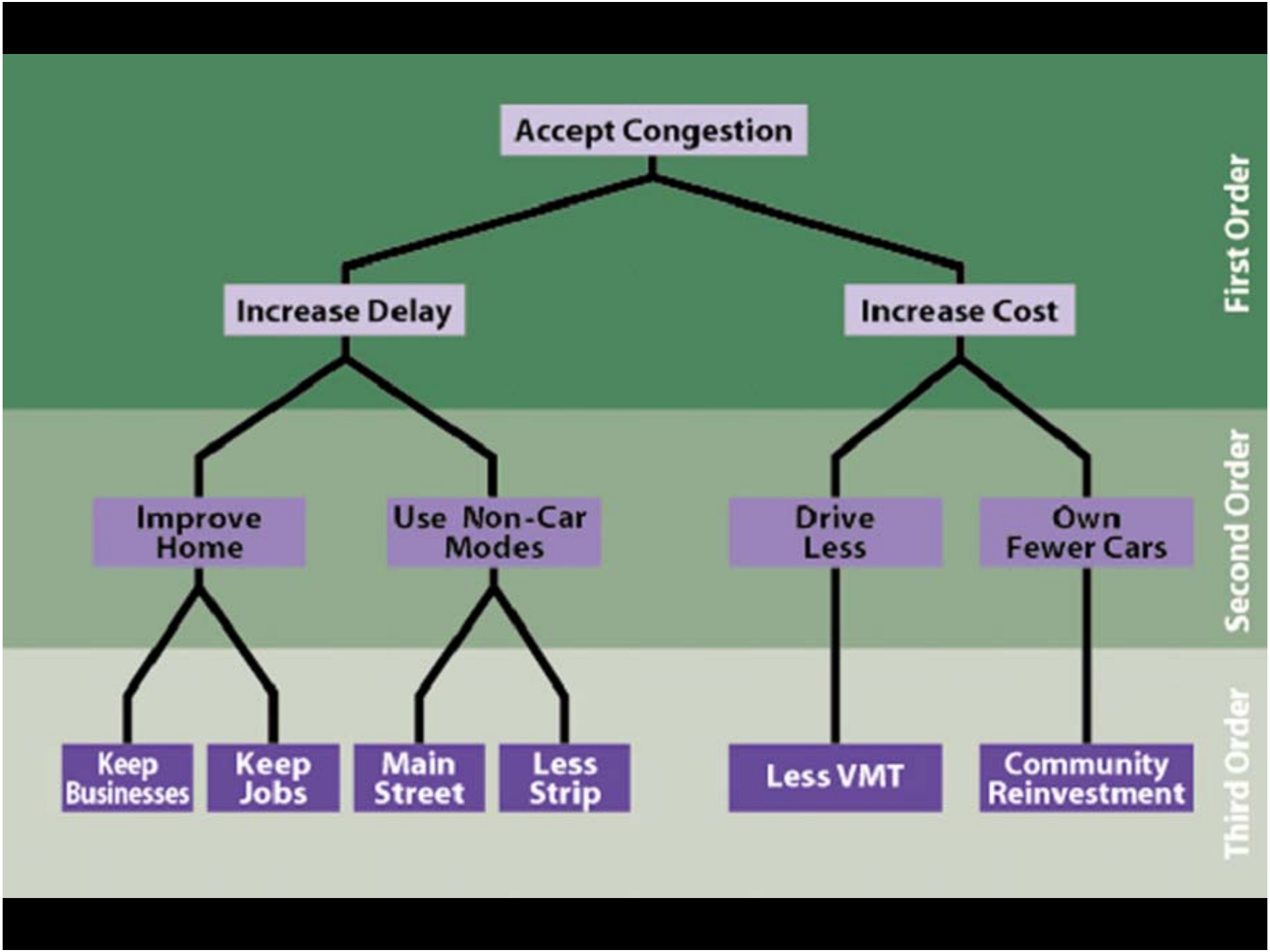

TO MAKE THIS MORE
EFFICIENT, SHOULD I ADD TWO MORE
OR FOUR MORE LANES?

EFFICIENCY ?



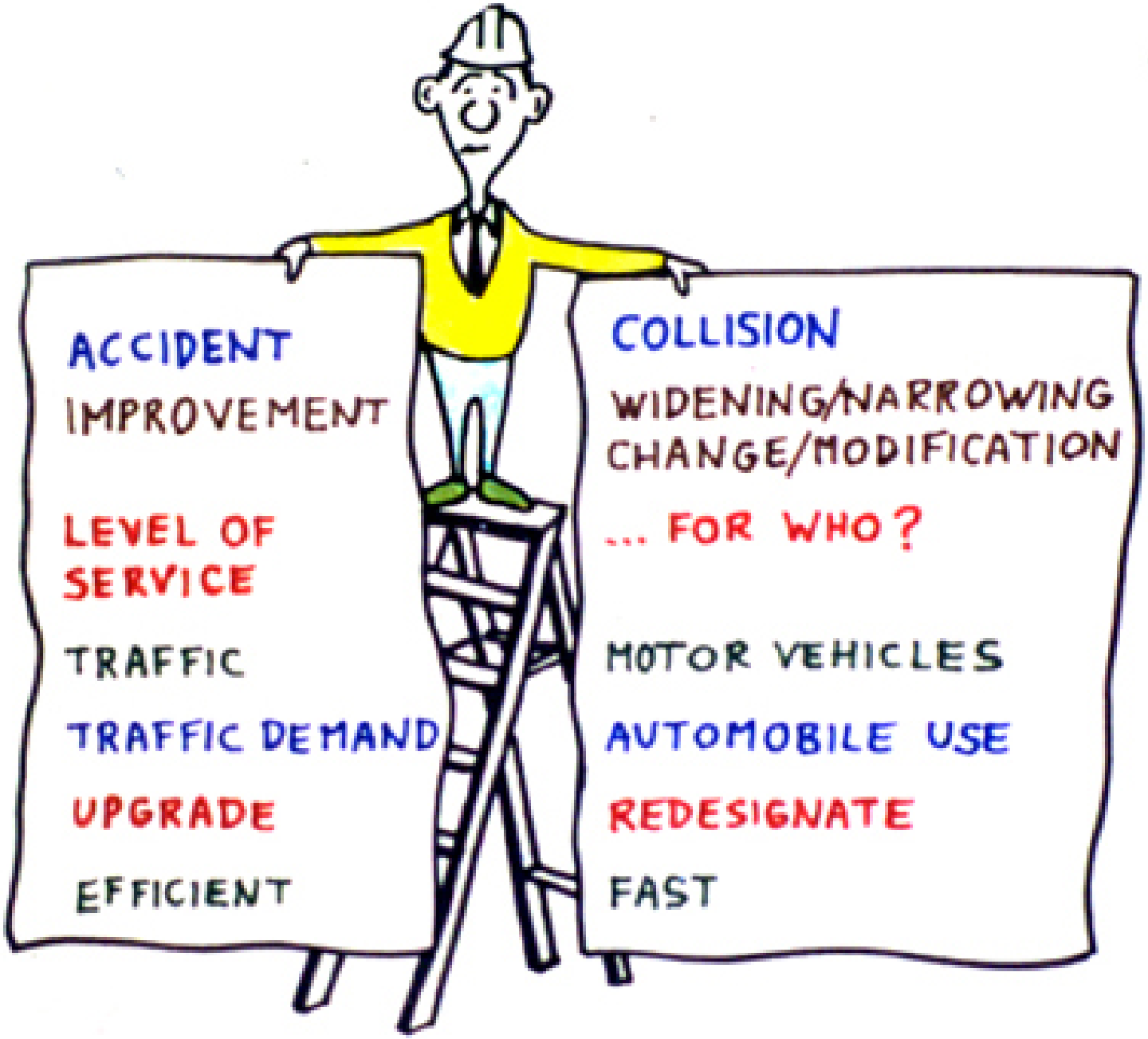

80
60
40
20
MJ/CAPITA
HOUSTON
PHOENIX
DETROIT
DENVER
L.A.
SAN FRANSISCO
BOSTON
WASHINGTON D.C
CHICAGO
NEW YORK
PERTH
BRISBANE
MELBOURNE
ADELAIDE
SYDNEY
TORONTO
HAMBURG
ZURICH
PARIS
FRANKFURT
BRUSSELS
COPEN-
HAGEN
MUNICH
LONDON
OSLO
TOKYO
AMSTERDAM
SINGAPORE
HONG KONG
MOSCOW
11.44
100
200
300
DENSITY (PERSON/HA)


Widen Road
Reduce Delay
Reduce Cost
Move Home
Range Farther
Drive More
Own More Cars
Move Businesses
Move Jobs
Mega Boxes
More Strip
More Lane Miles
New Construction
First Order
Second Order
Third Order


Accept Congestion
Increase Delay
Increase Cost
Improve Home
Use Non-Car Modes
Drive Less
Own Fewer Cars
Keep Businesses
Keep Jobs
Main Street
Less Strip
Less VMT
Community Reinvestment
First Order
Second Order
Third Order

CAPACITY OF STREETS

I TOLD YOU THAT SIX LANES WOULD IMPROVE THE *LEVEL OF SERVICE.*

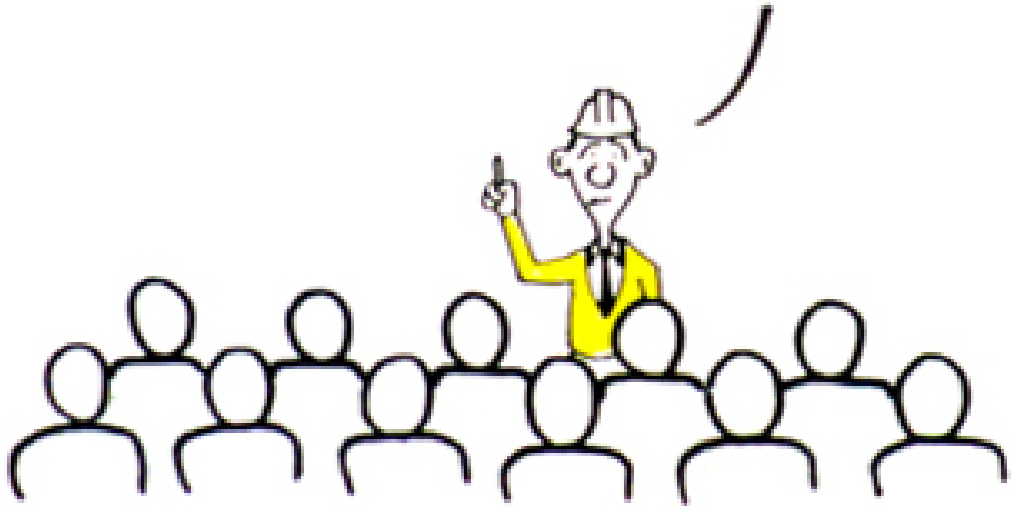

ACCIDENT
IMPROVEMENT
LEVEL OF SERVICE
TRAFFIC
TRAFFIC DEMAND
UPGRADE
EFFICIENT
COLLISION
WIDENING/NARROWING
CHANGE/MODIFICATION
... FOR WHO?
MOTOR VEHICLES
AUTOMOBILE USE
REDESIGNATE
FAST

THE IMPROVEMENTS TO THE INTERSECTIONS AND THE UPGRADING OF THE ROAD TO FOUR LANES WILL NOT ONLY ENHANCE THE CAPACITY TO MEET FUTURE TRAFFIC DEMANDS, BUT THE LEVEL OF SERVICE WILL IMPROVE FROM "D" TO "B".

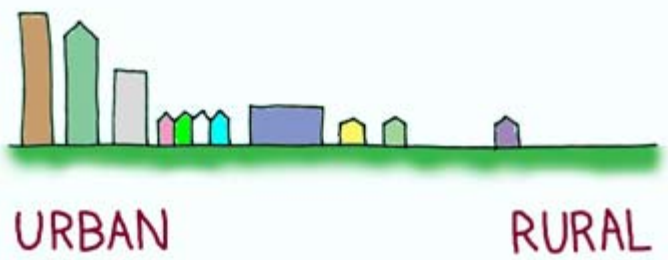
TRANSPORTATION PROFESSIONALS

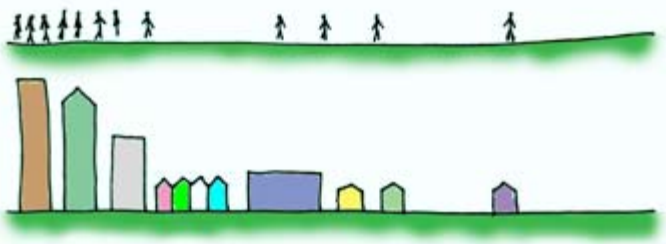
(NEED TO BE AND APPEAR TO BE UNBIASED)

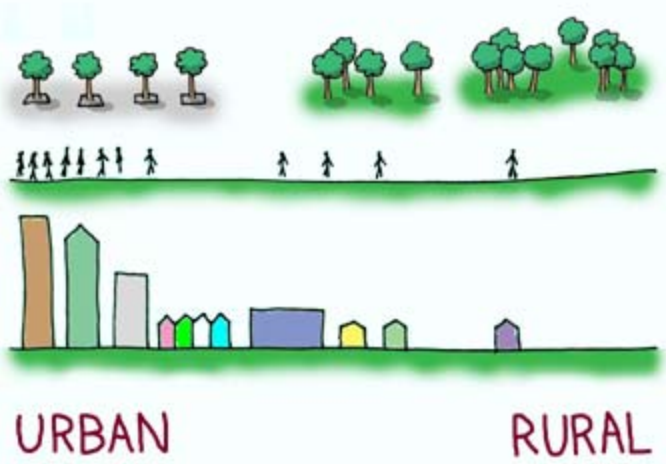
THE CHANGES TO THE INTERSECTIONS AND ADDING TWO AUTOMOBILE LANES WILL ACCOMMODATE THE ADDITIONAL AUTOMOBILE TRAFFIC THAT WE FORECASTED. THE LEVEL OF SERVICE FOR AUTOMOBILE USERS WILL INCREASE FROM "D" TO "B" DURING THE WEEKDAY PEAK HOUR OF AUTOMOBILE USE.

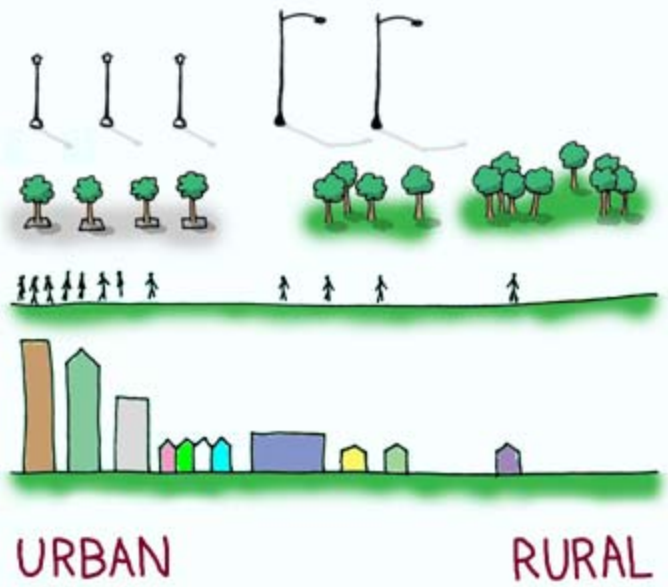


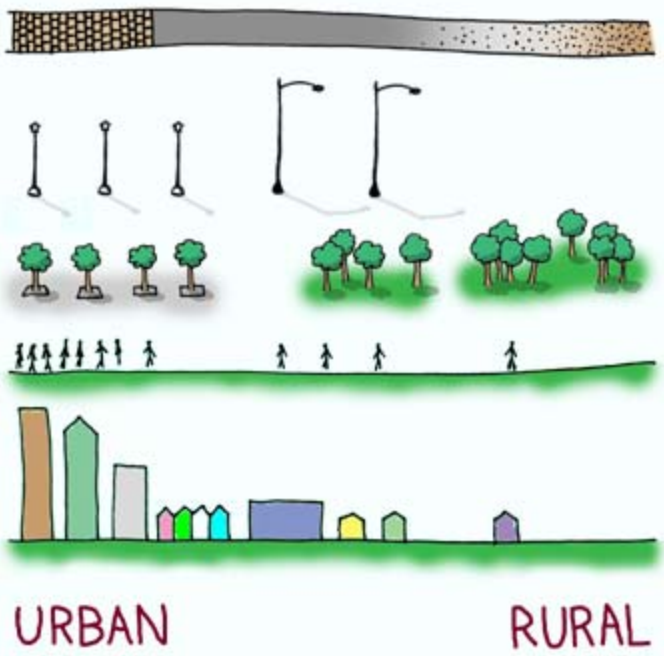

14

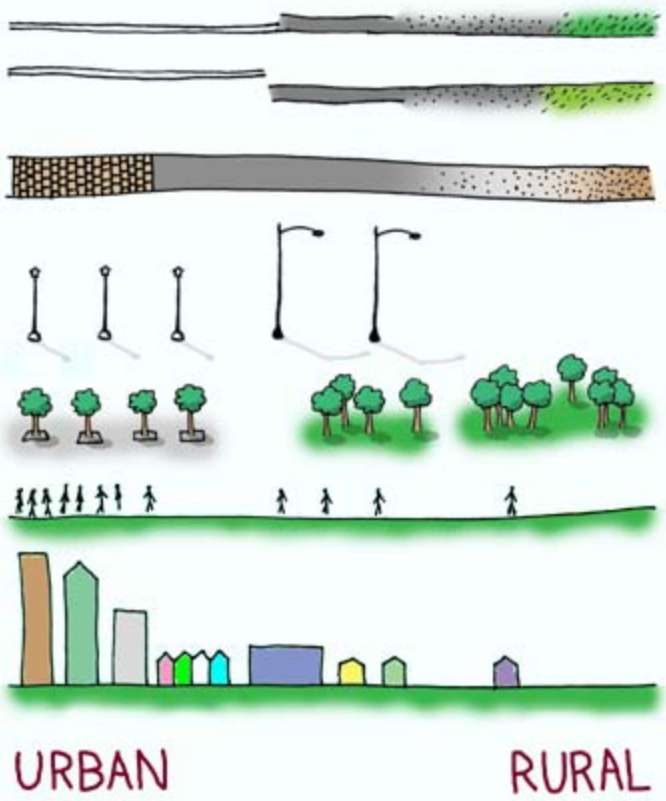

URBAN
RURAL

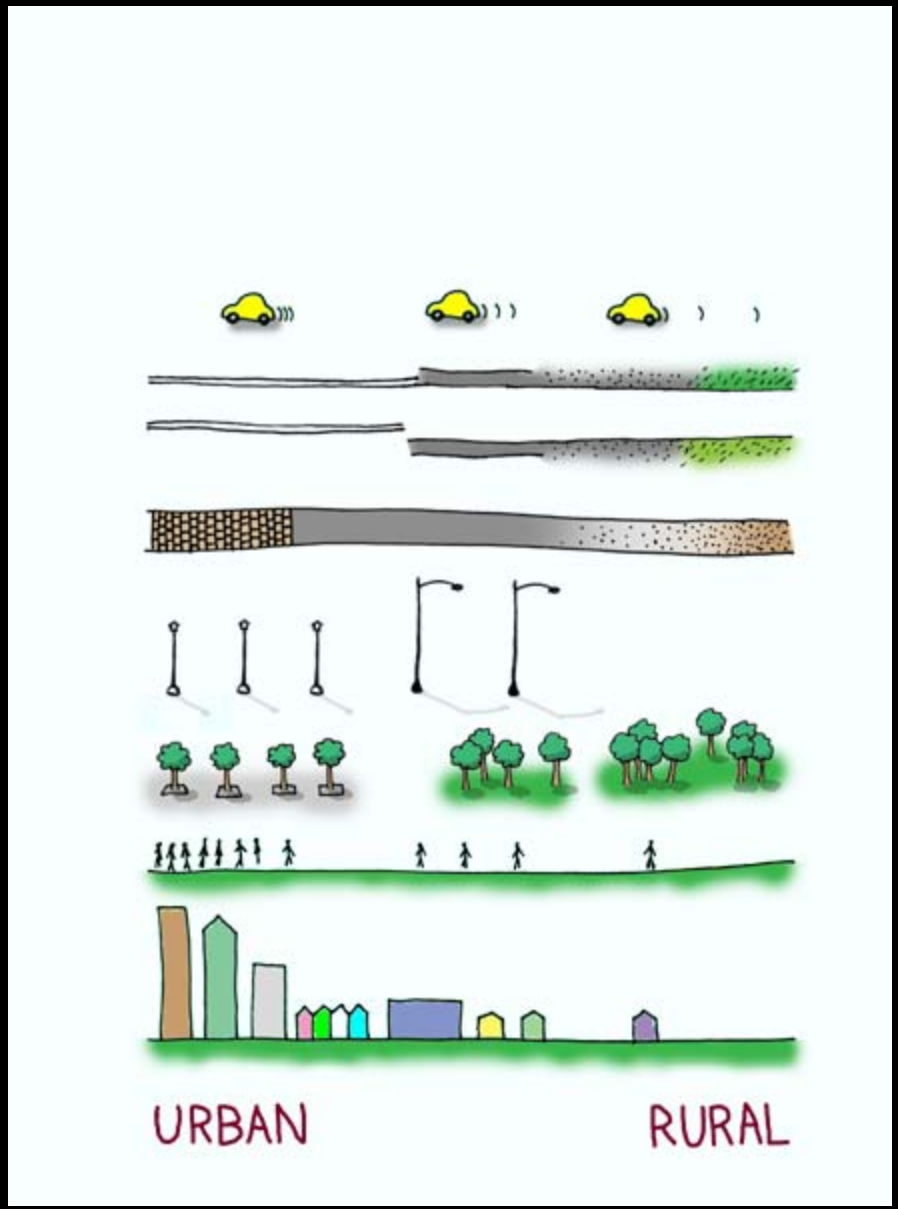

URBAN
RURAL

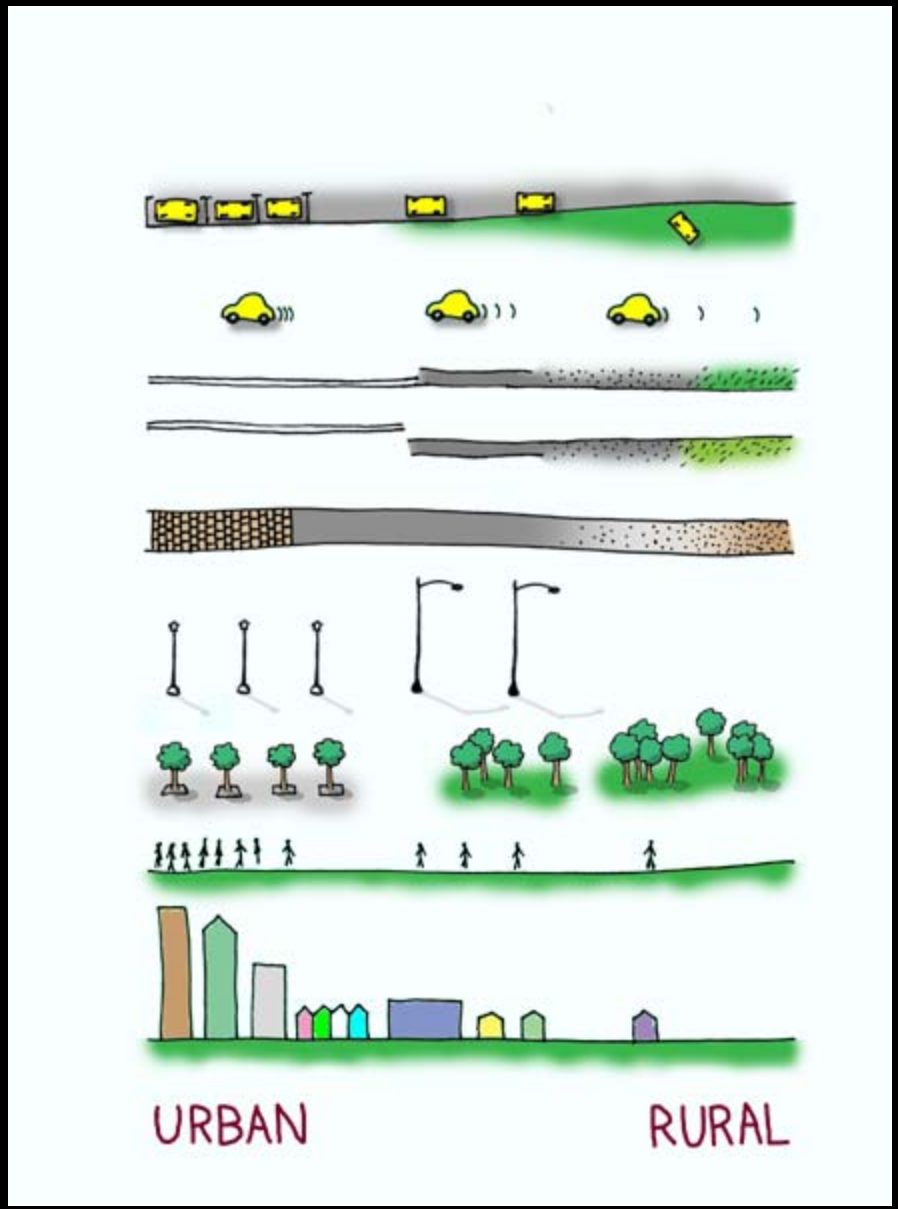

URBAN
RURAL

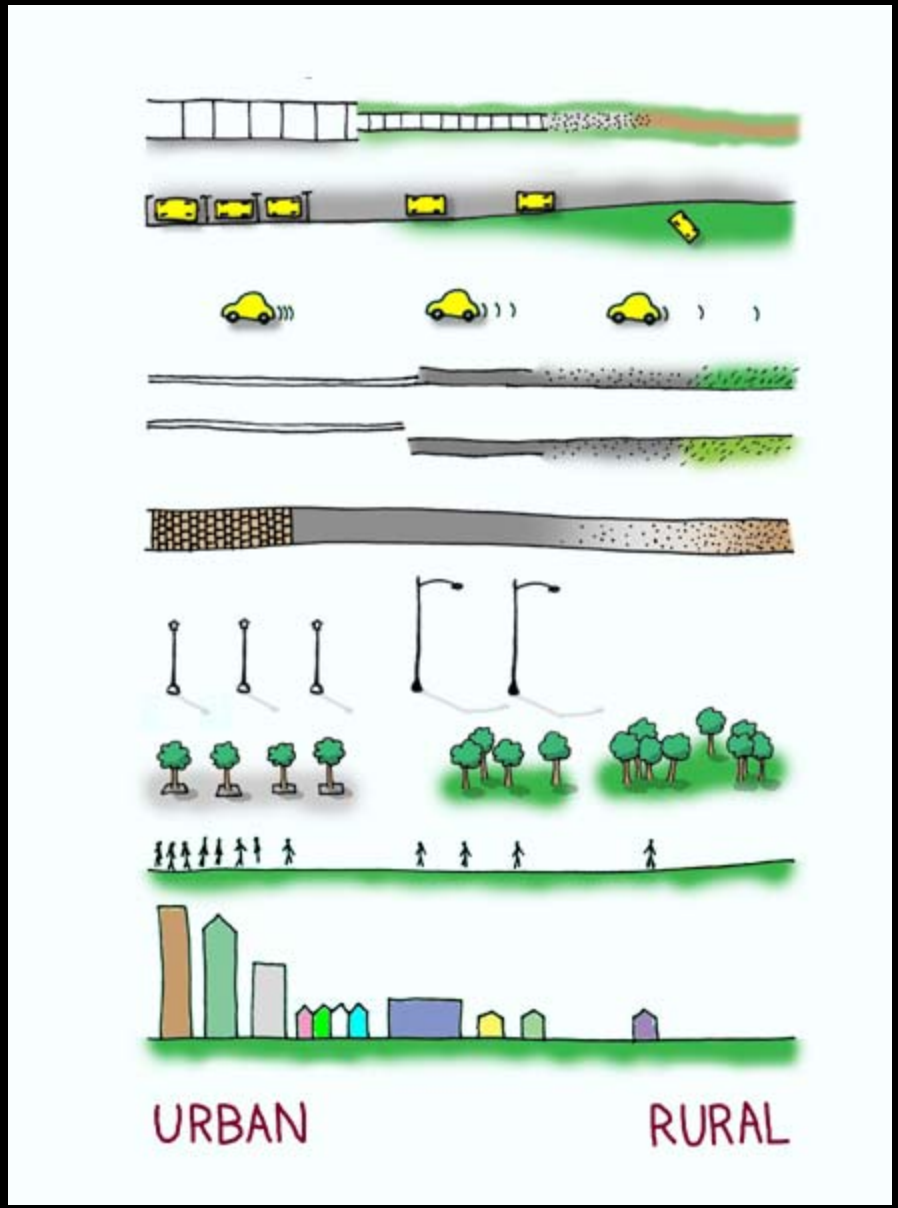

URBAN
RURAL

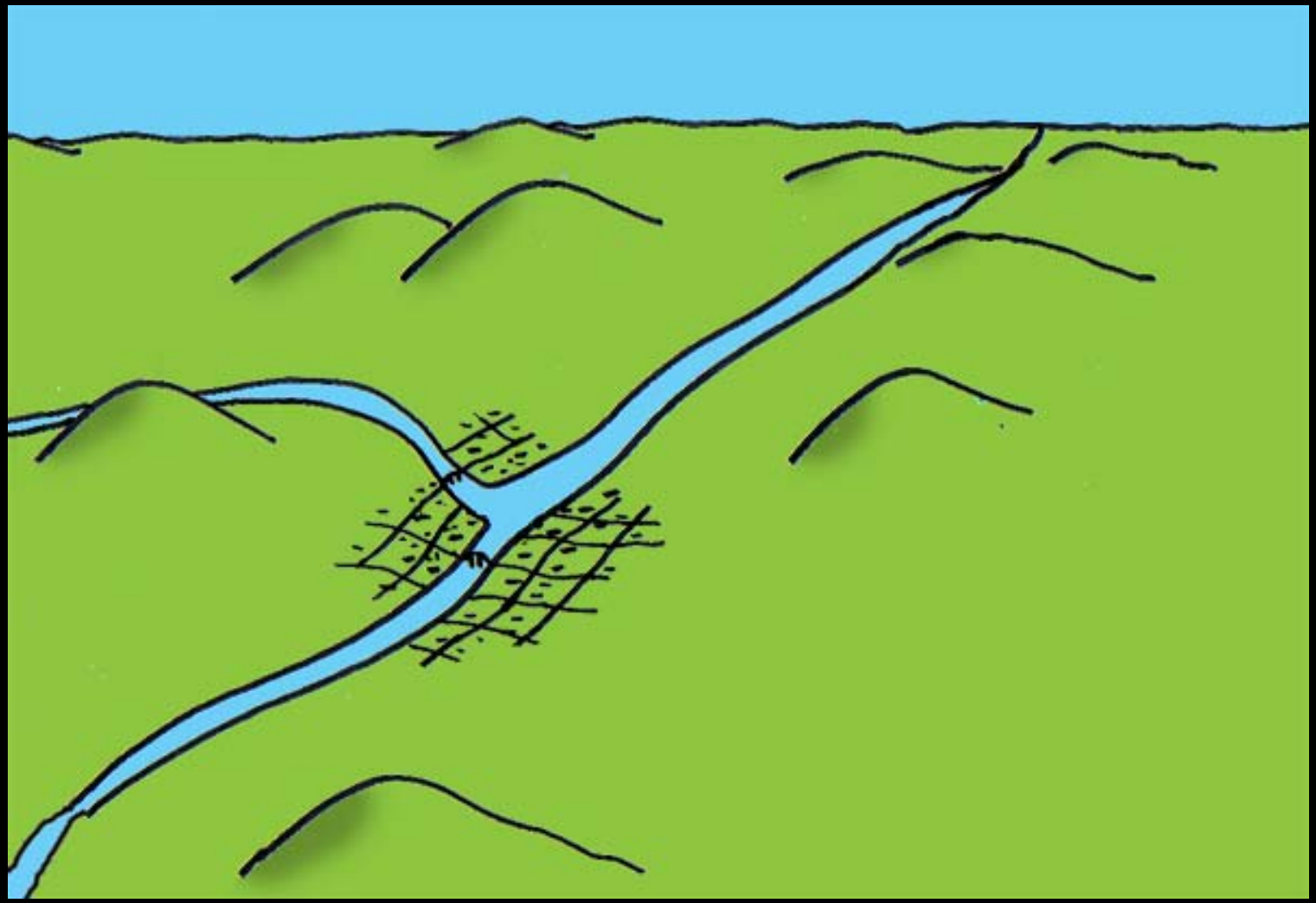

URBAN
RURAL

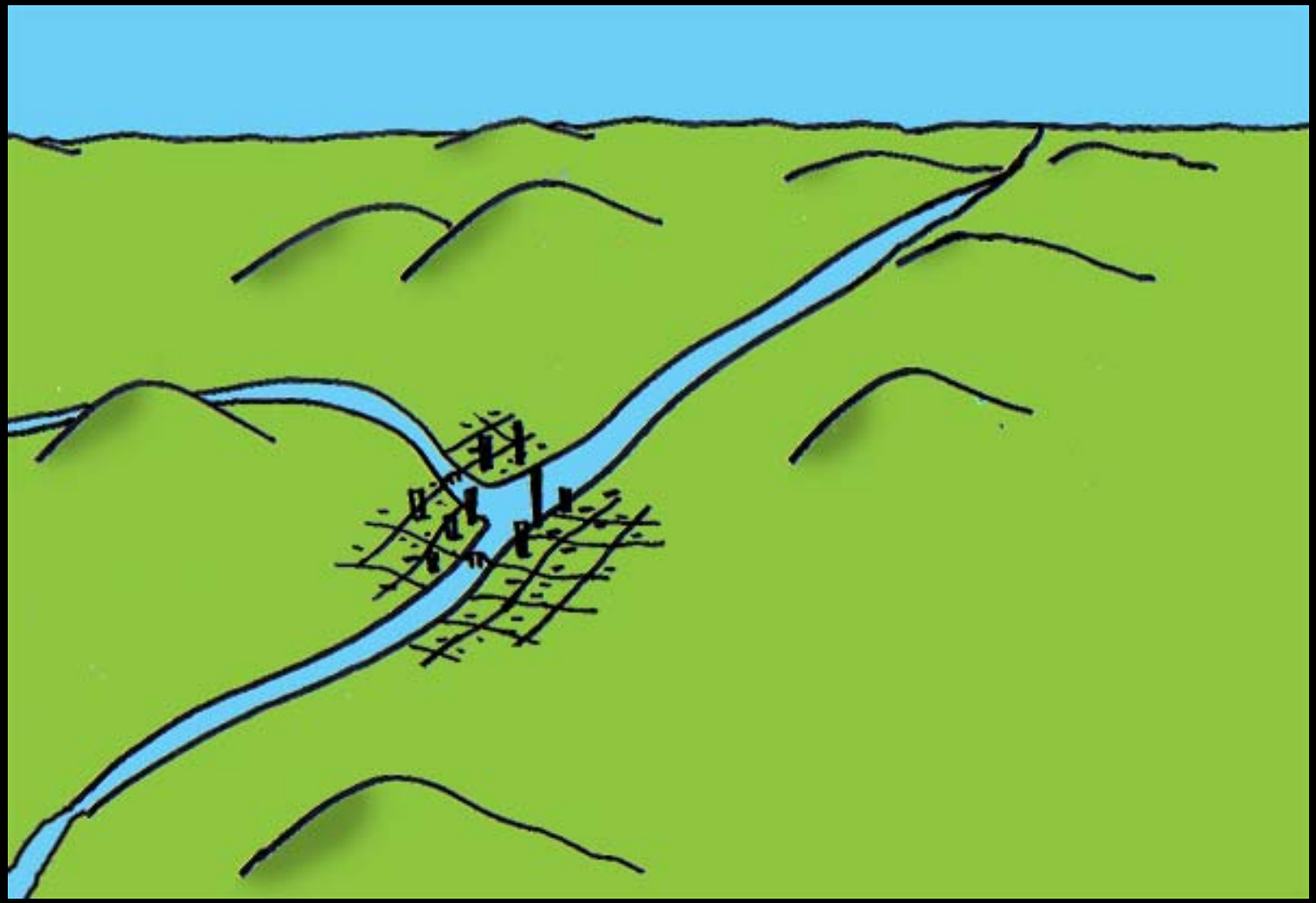

URBAN
RURAL

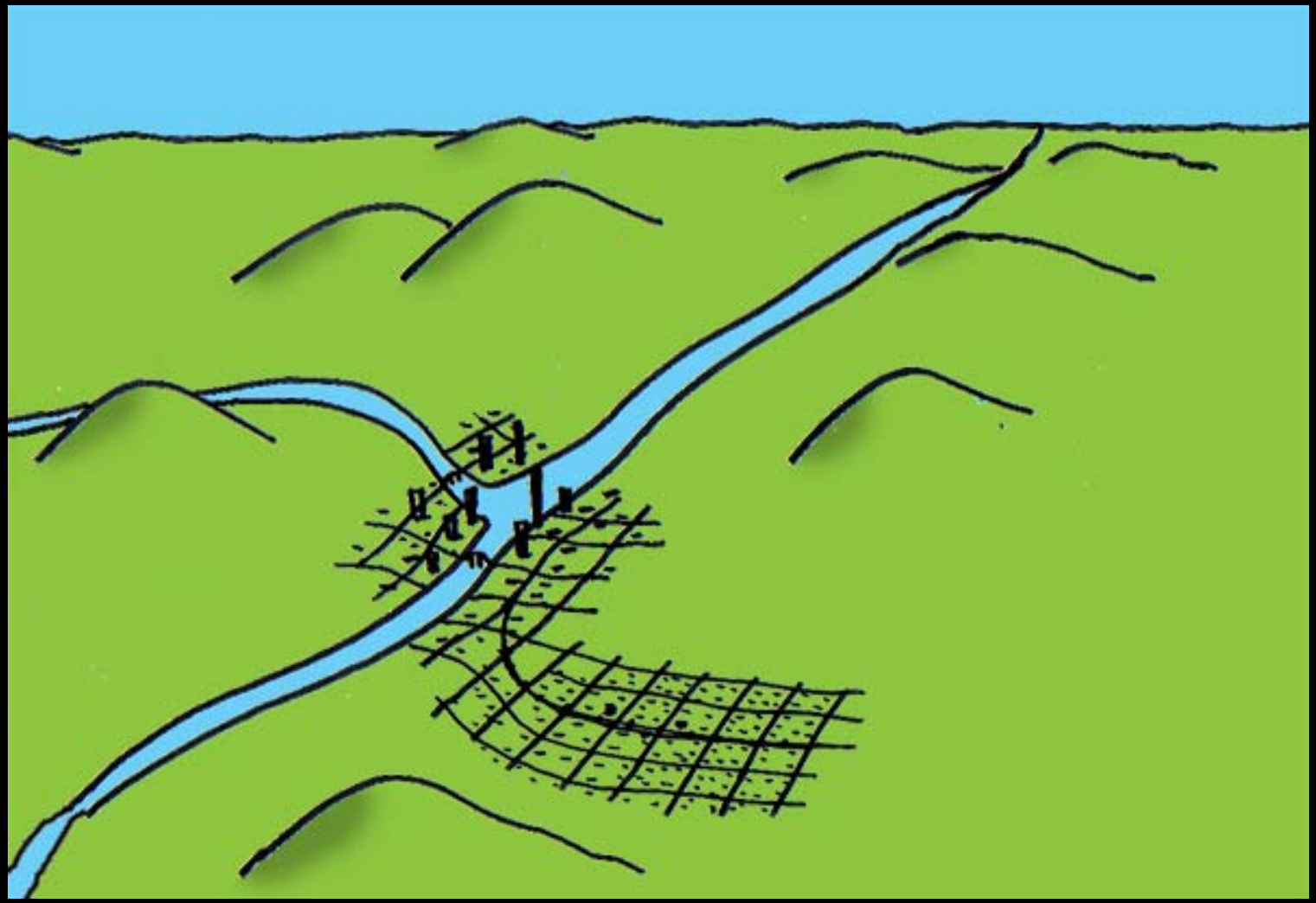

URBAN
RURAL

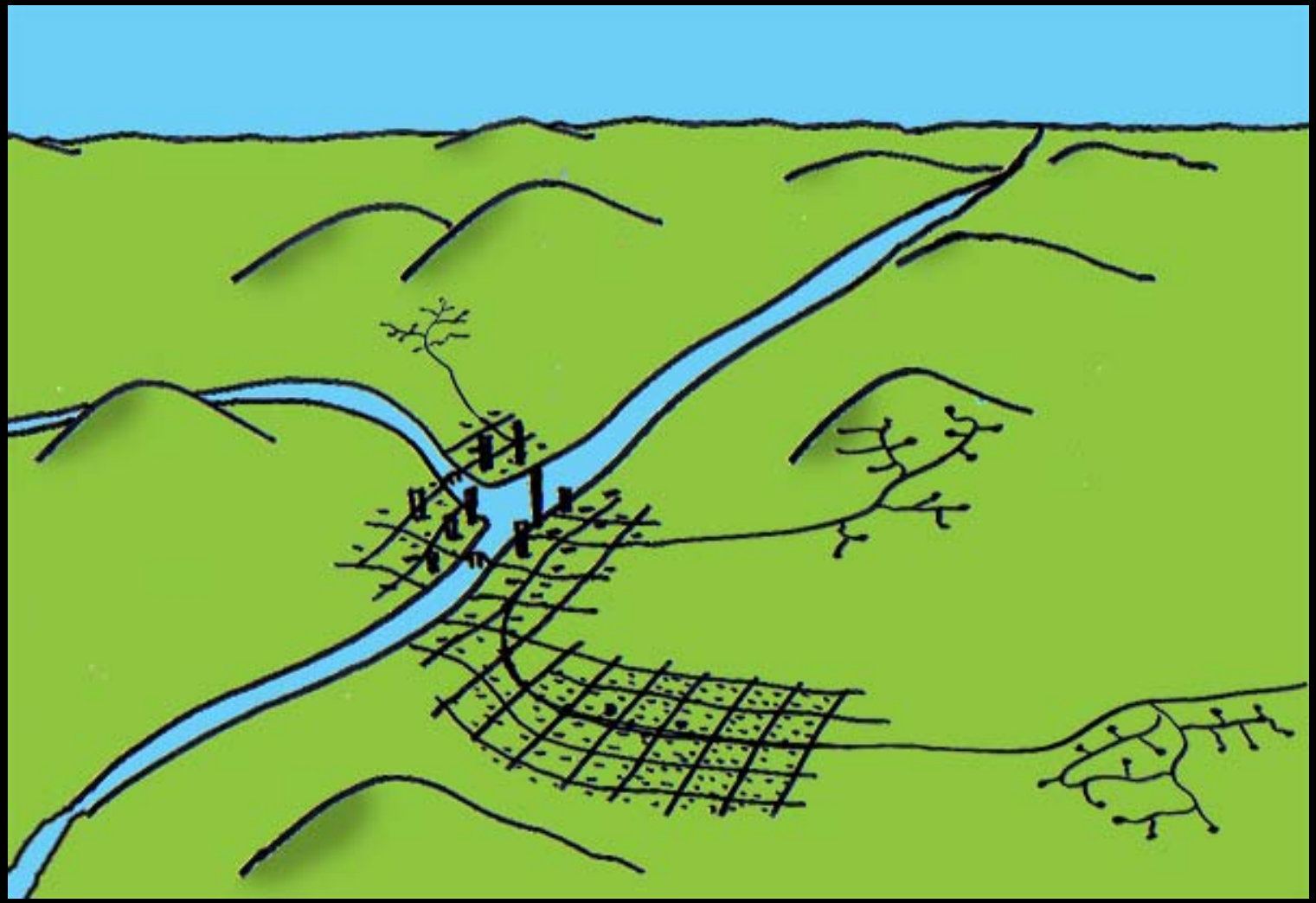

URBAN
RURAL

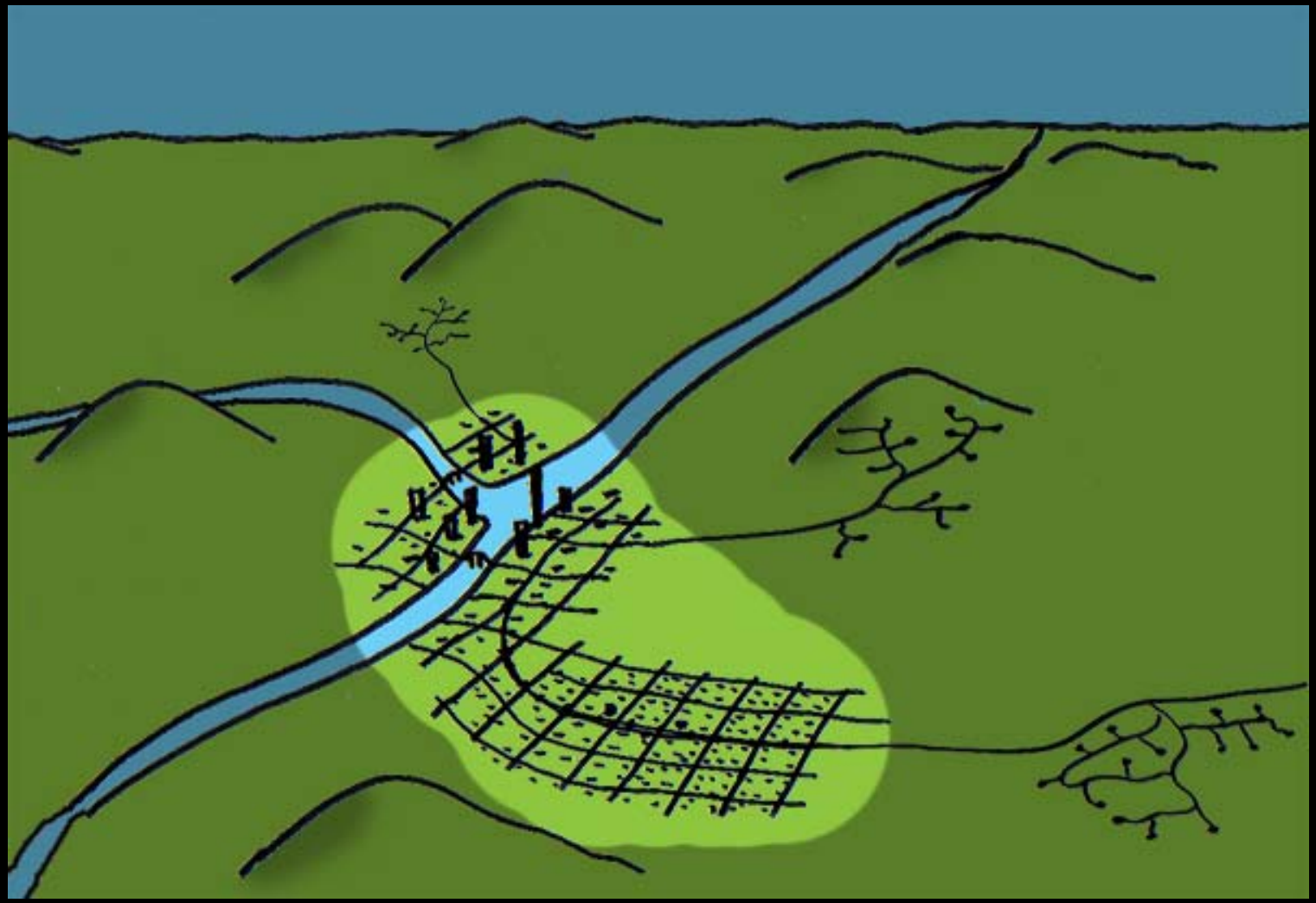

URBAN
RURAL

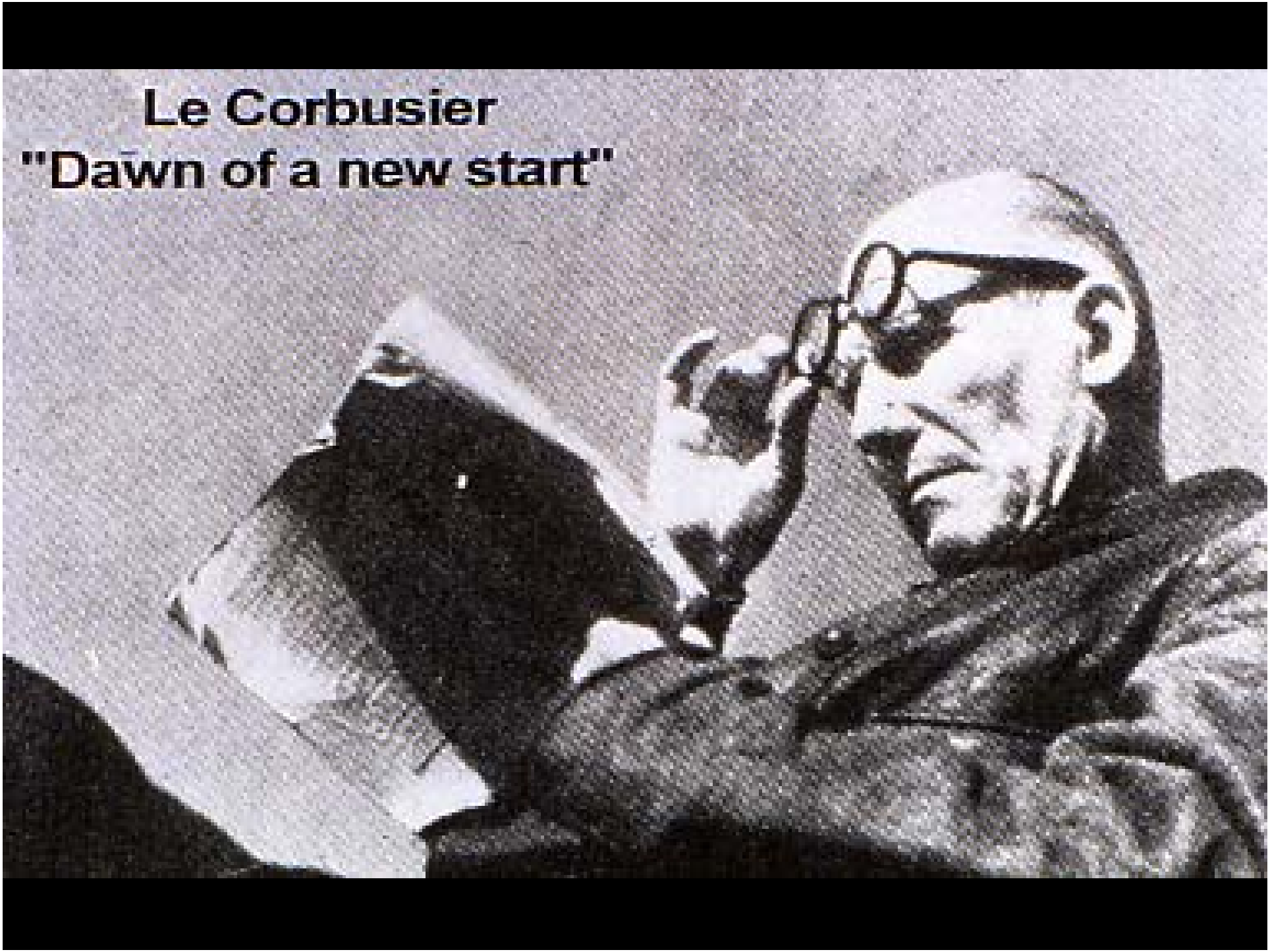




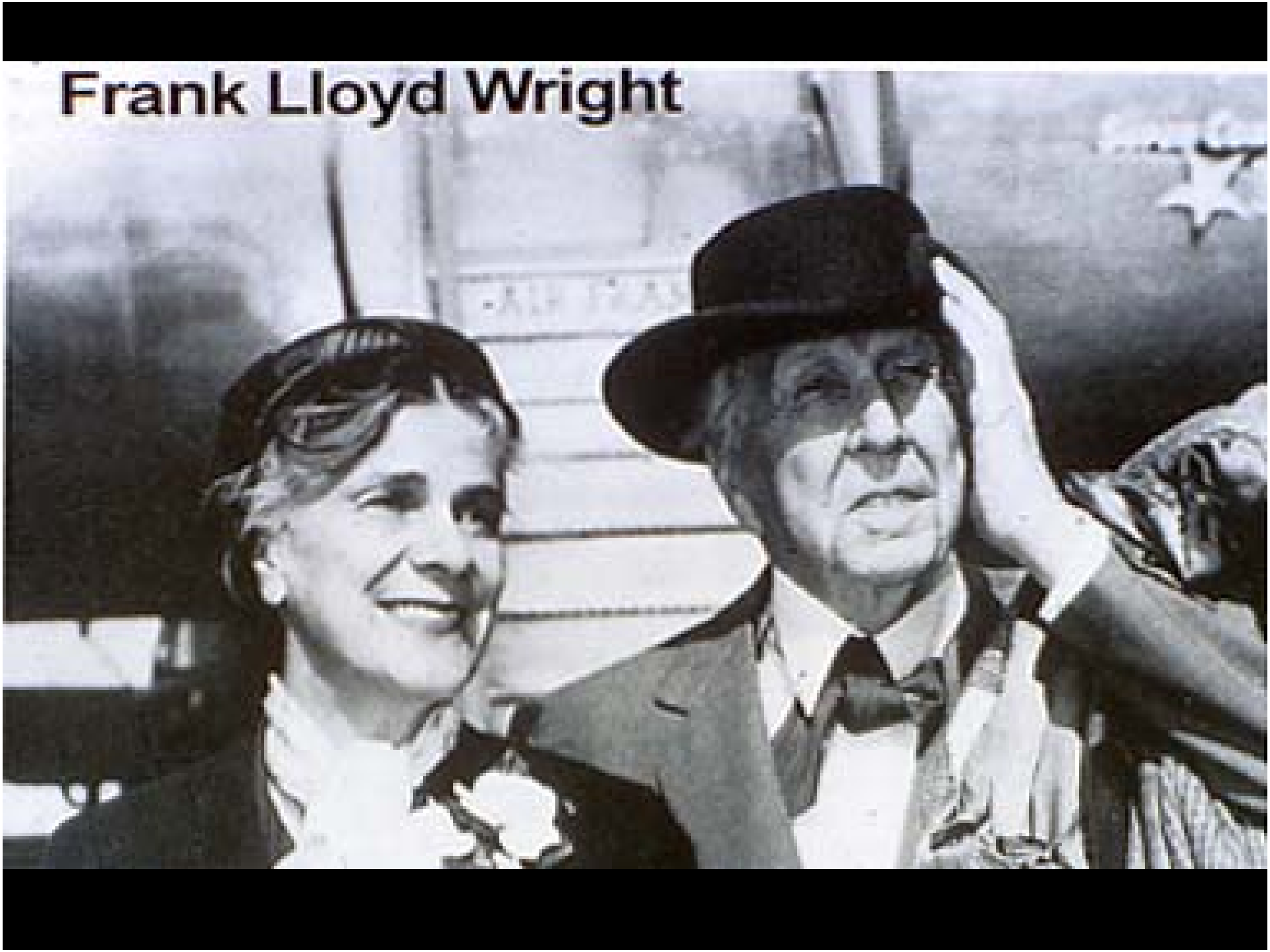


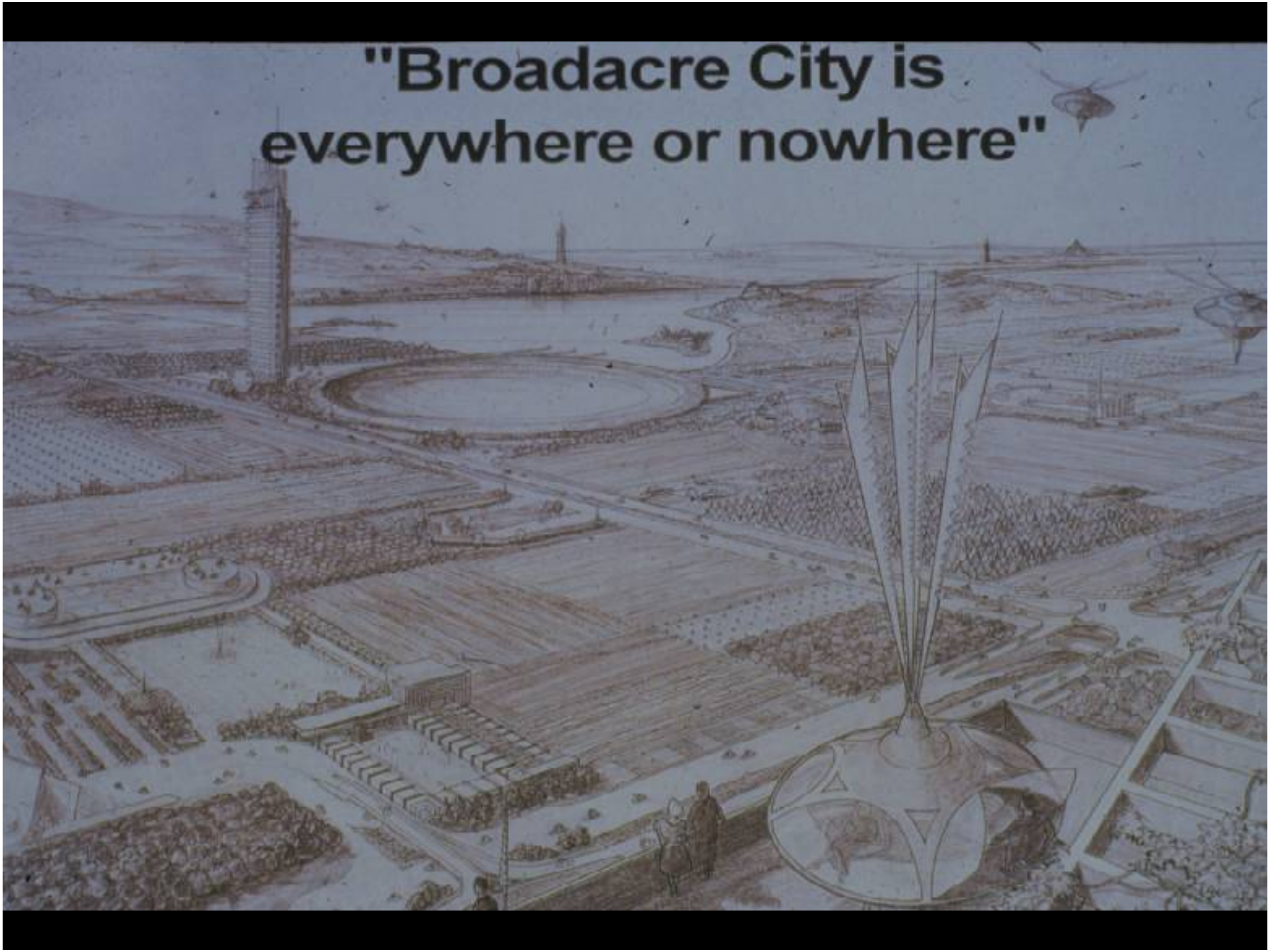


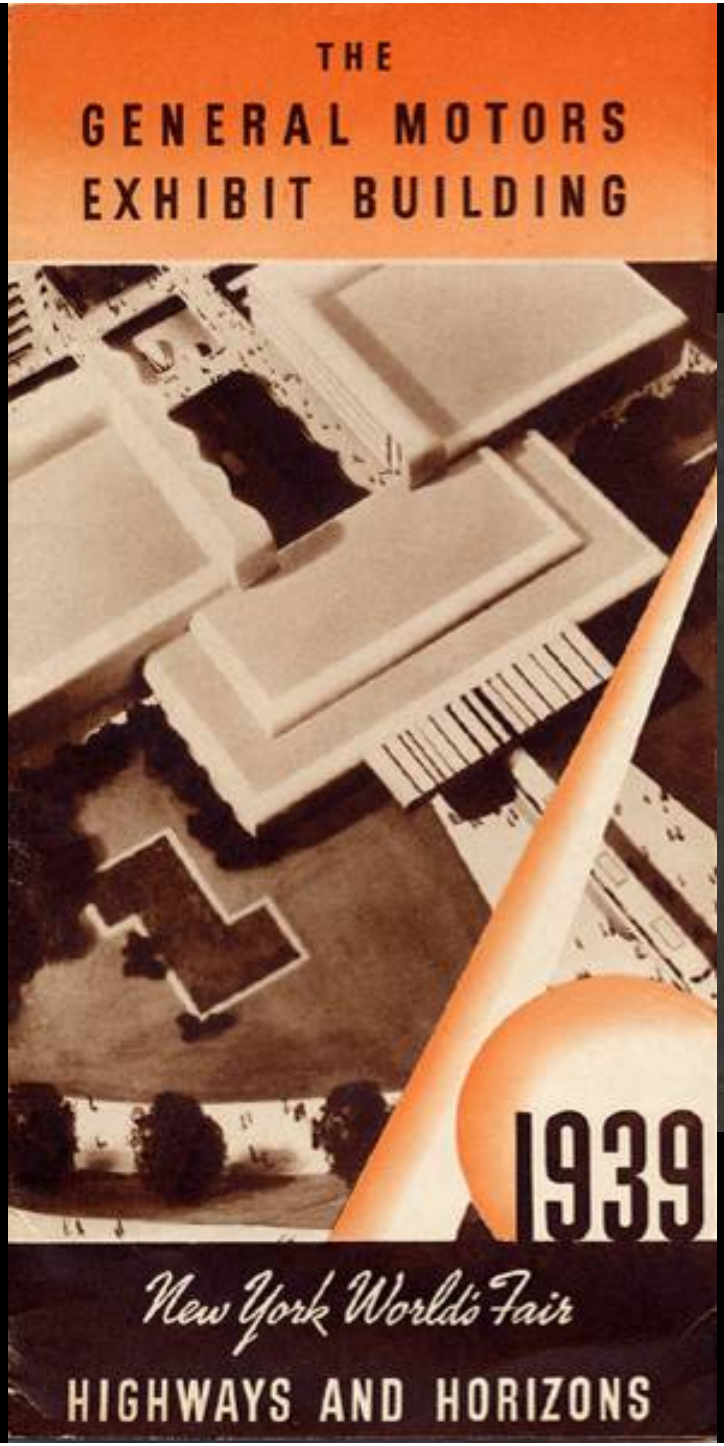


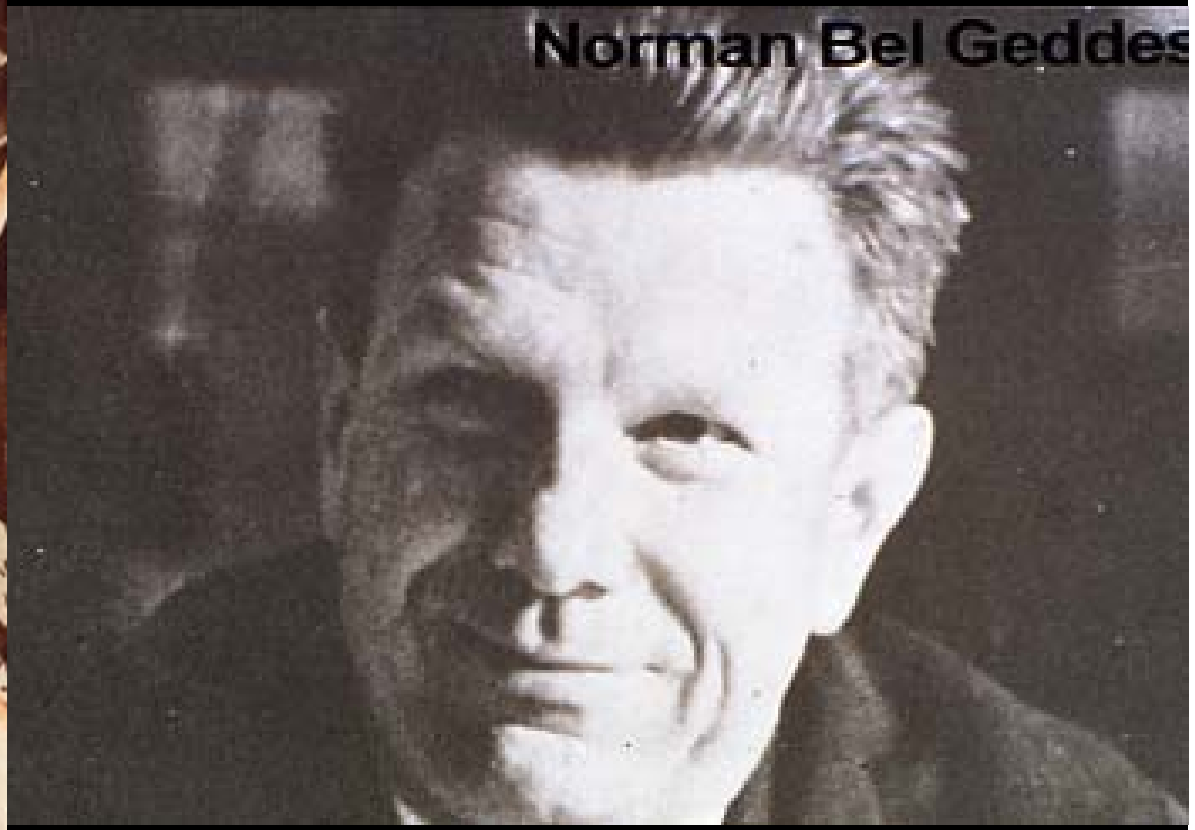

Le Corbusier
"Dawn of a new start"


"There is no longer any
place for the street with
it's traffic..."

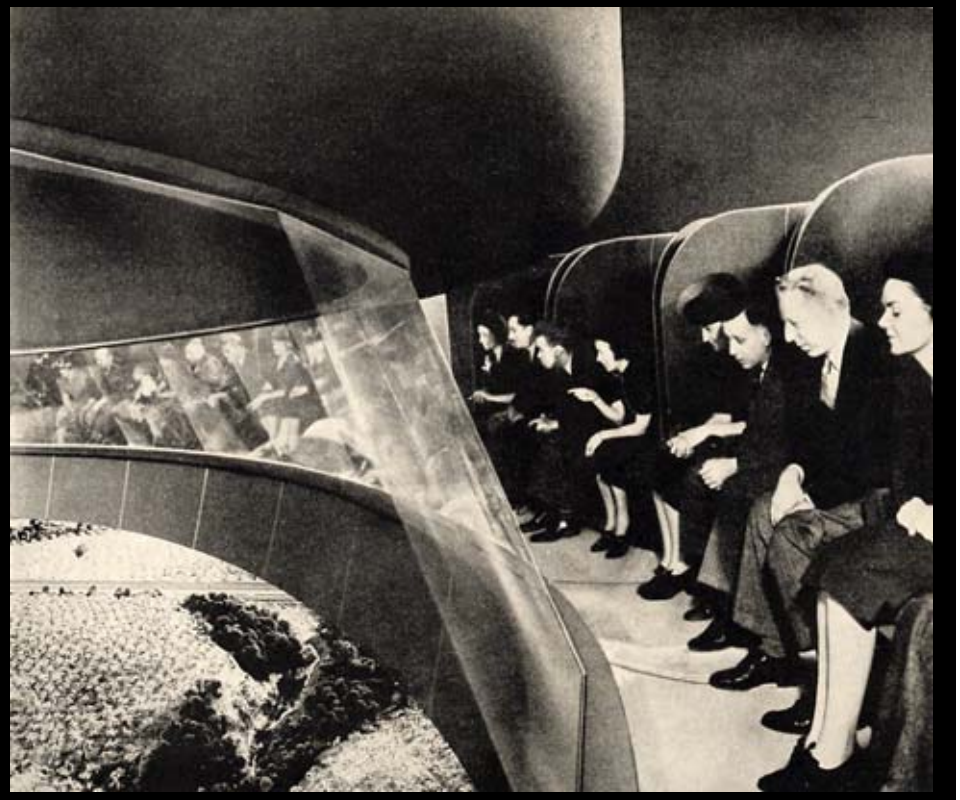

Frank Lloyd Wright


"Broadacre City is
everywhere or nowhere"


THE
GENERAL MOTORS
EXHIBIT BUILDING
1939
New York World's Fair
HIGHWAYS AND HORIZONS


Norman Bel Geddes


FUTURAMA




Price Chopper Plaza

WHY DO CITIES EXIST?

ACCESS

MOBILITY

50 mph

35 mph

45 mph

35 mph
School
Zone

40 mph

25 mph
School
Zone

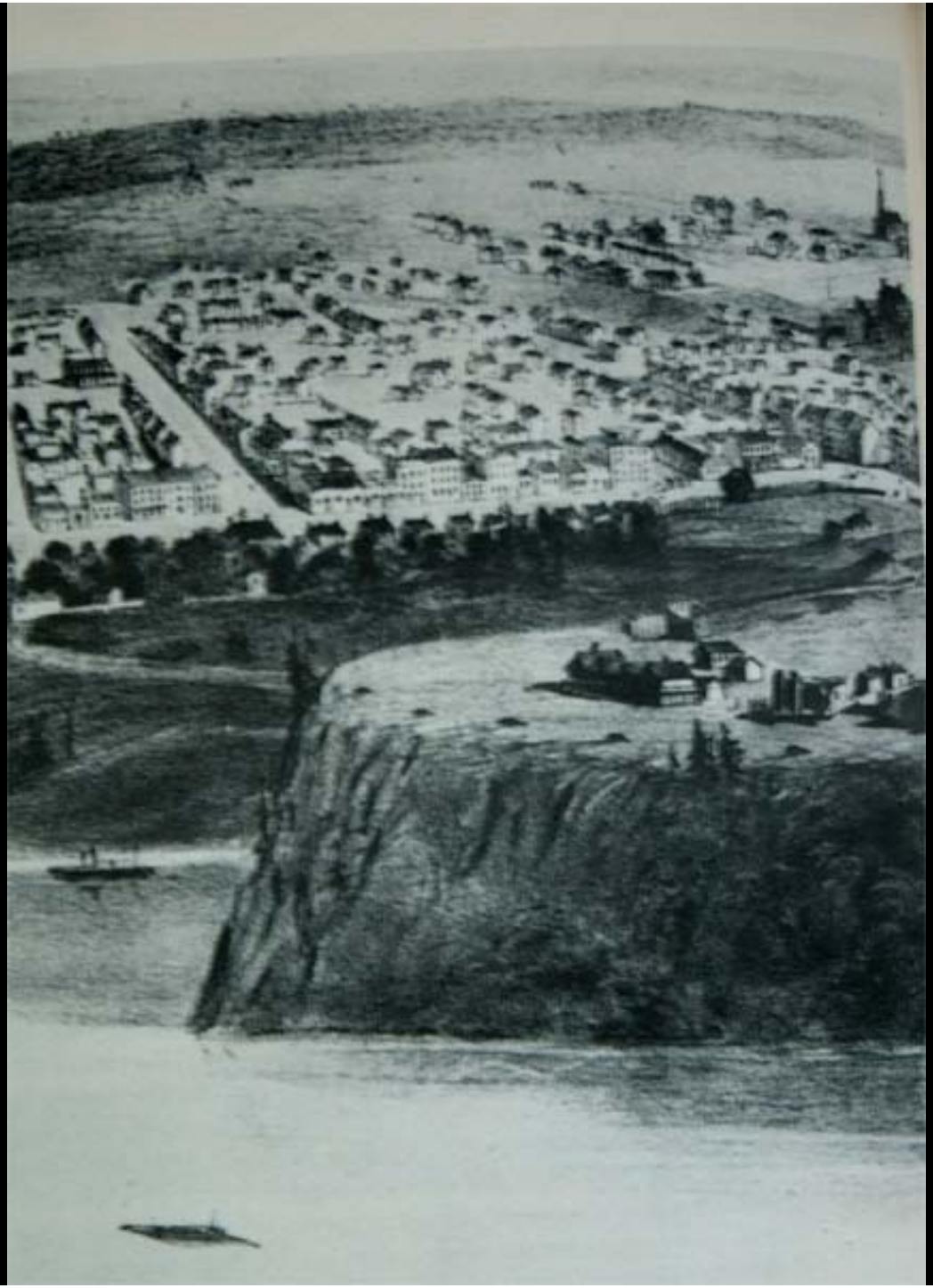

POPCORN
IS BAC
NORTH
LINK
WE HAVE MOVED!
8984 INTERNATIONAL DRI
FOR SALE
SUBURBAN

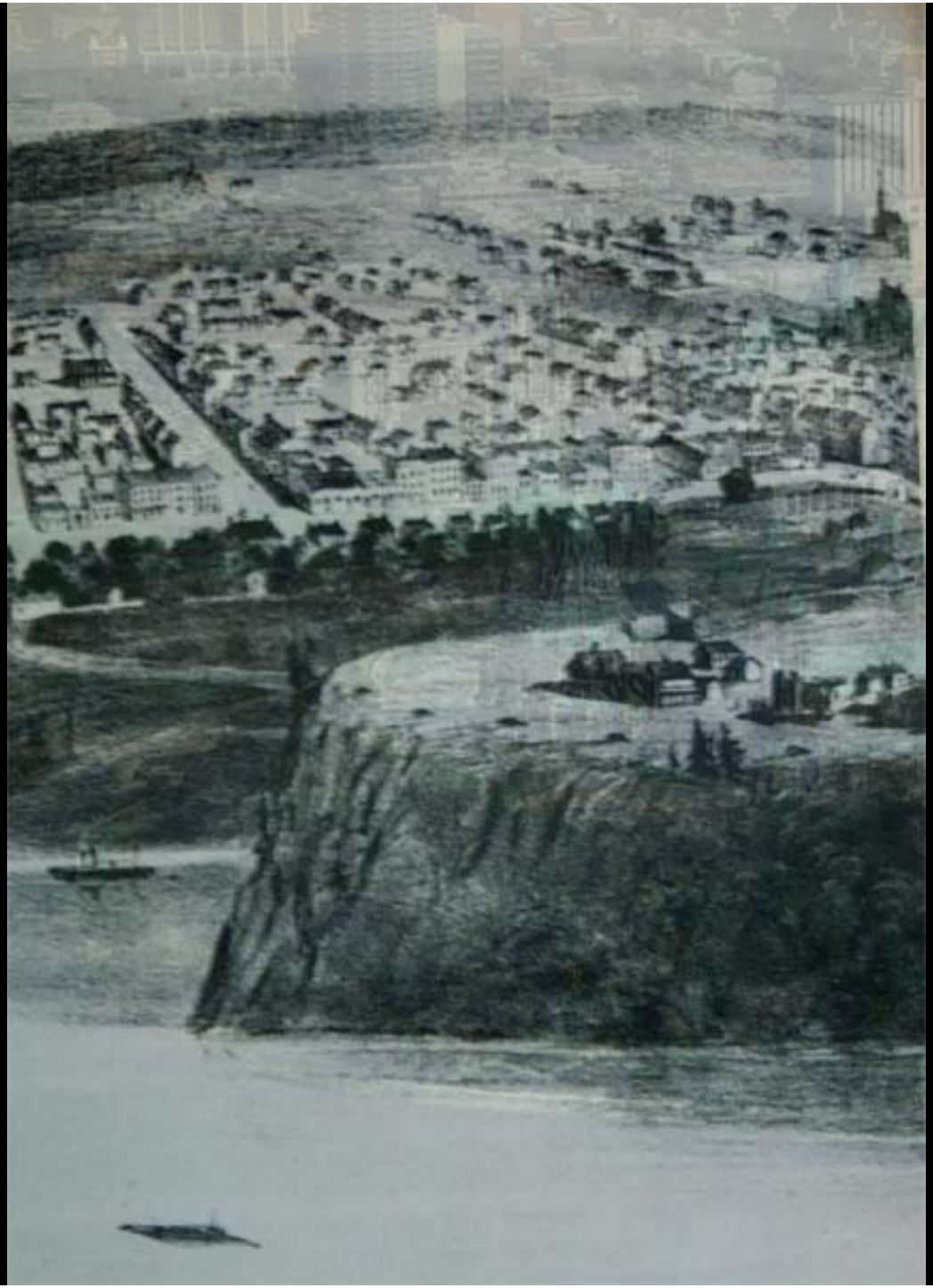
The answer is,

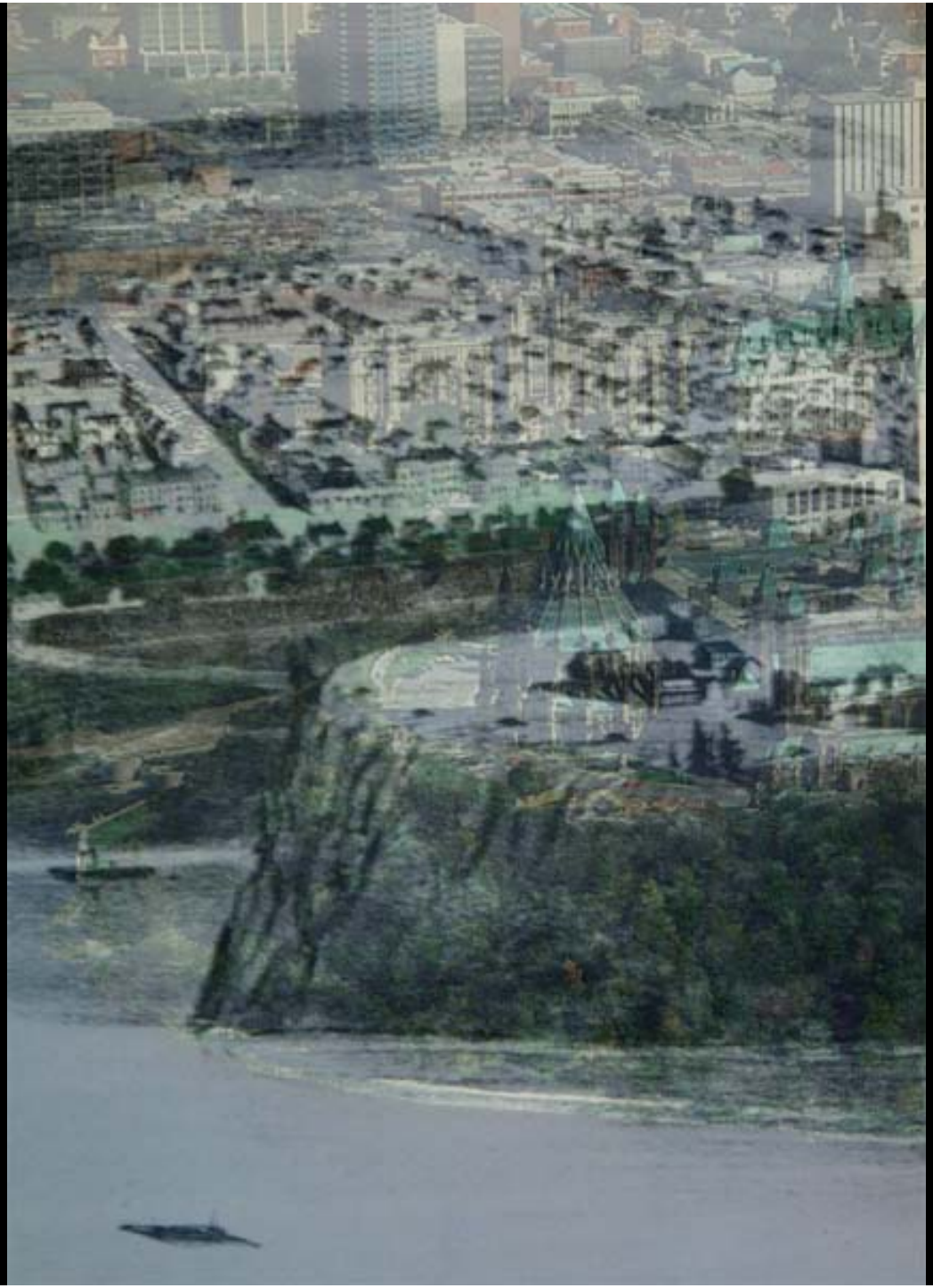
The answer is,
“Network & build to the street”

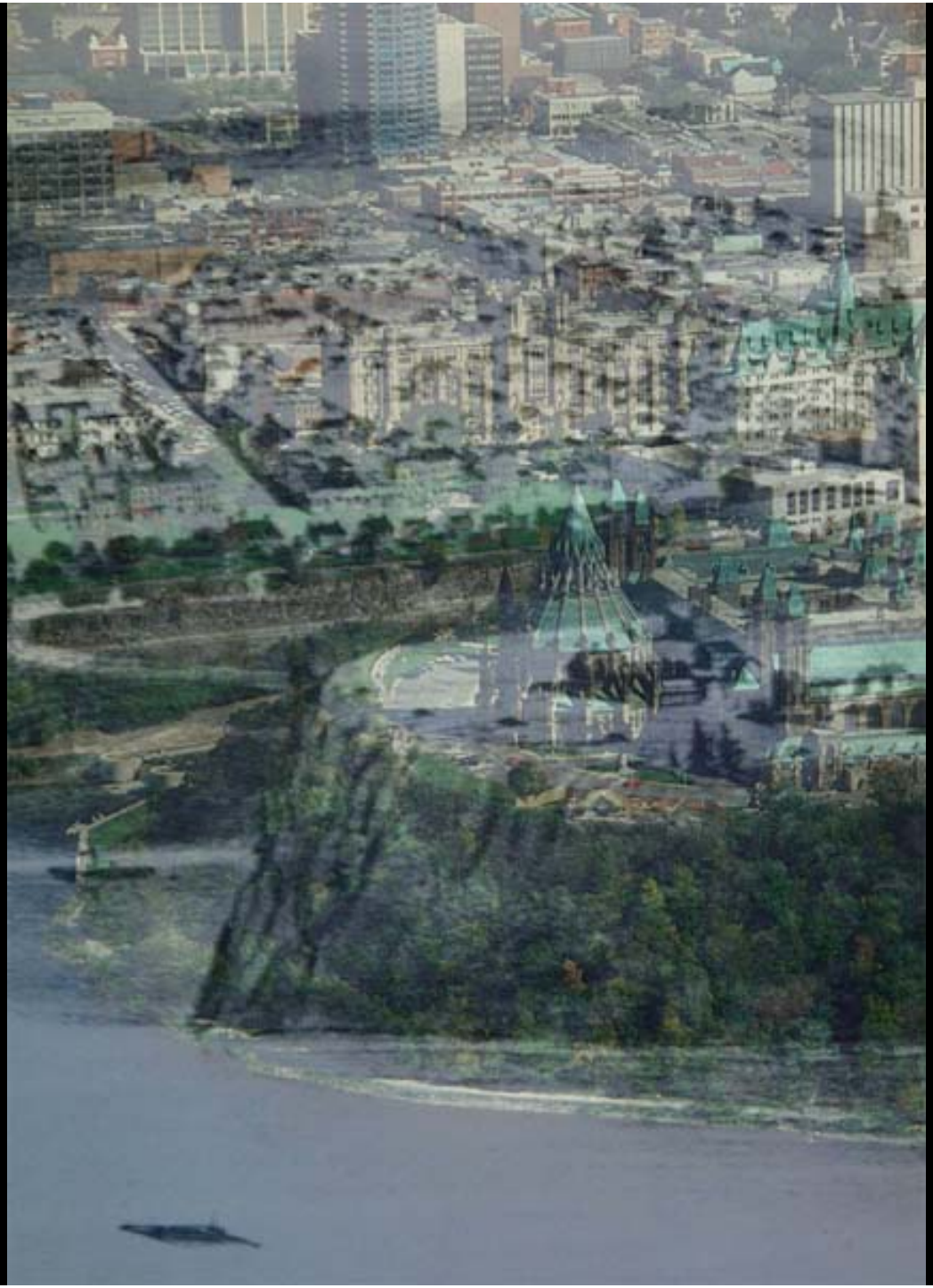
The answer is,
“Network & build to the street”

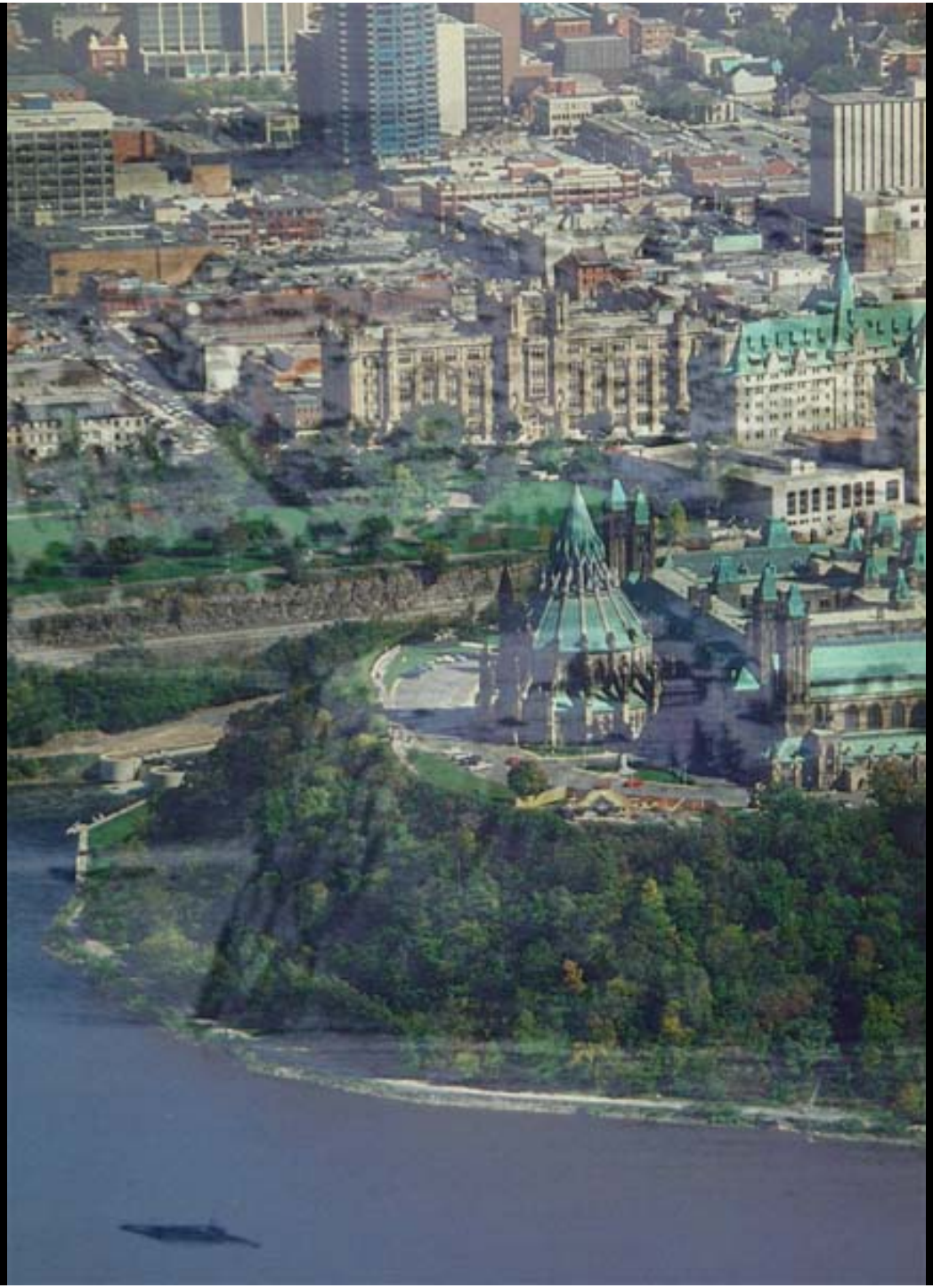
Now what was the question?

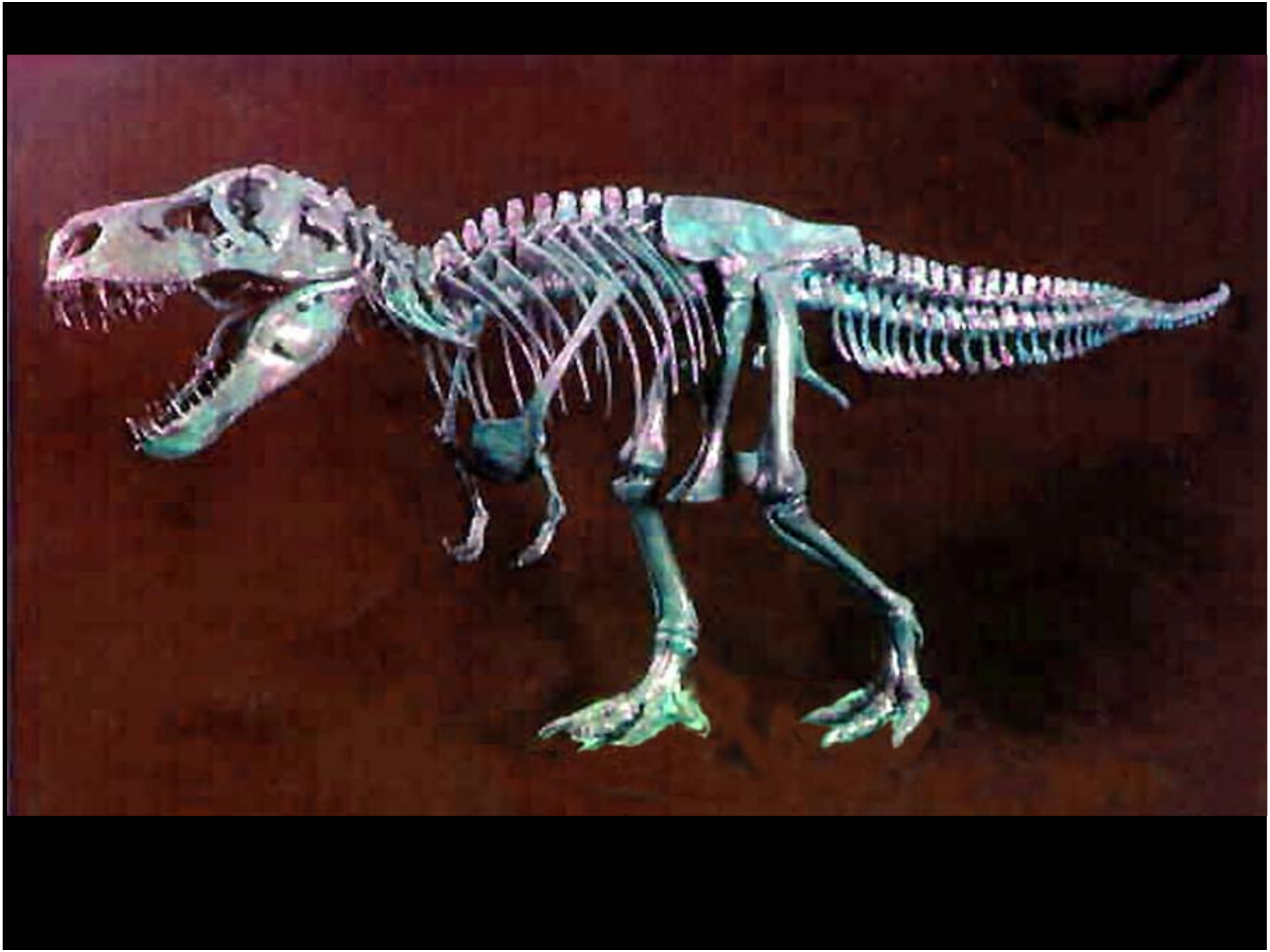


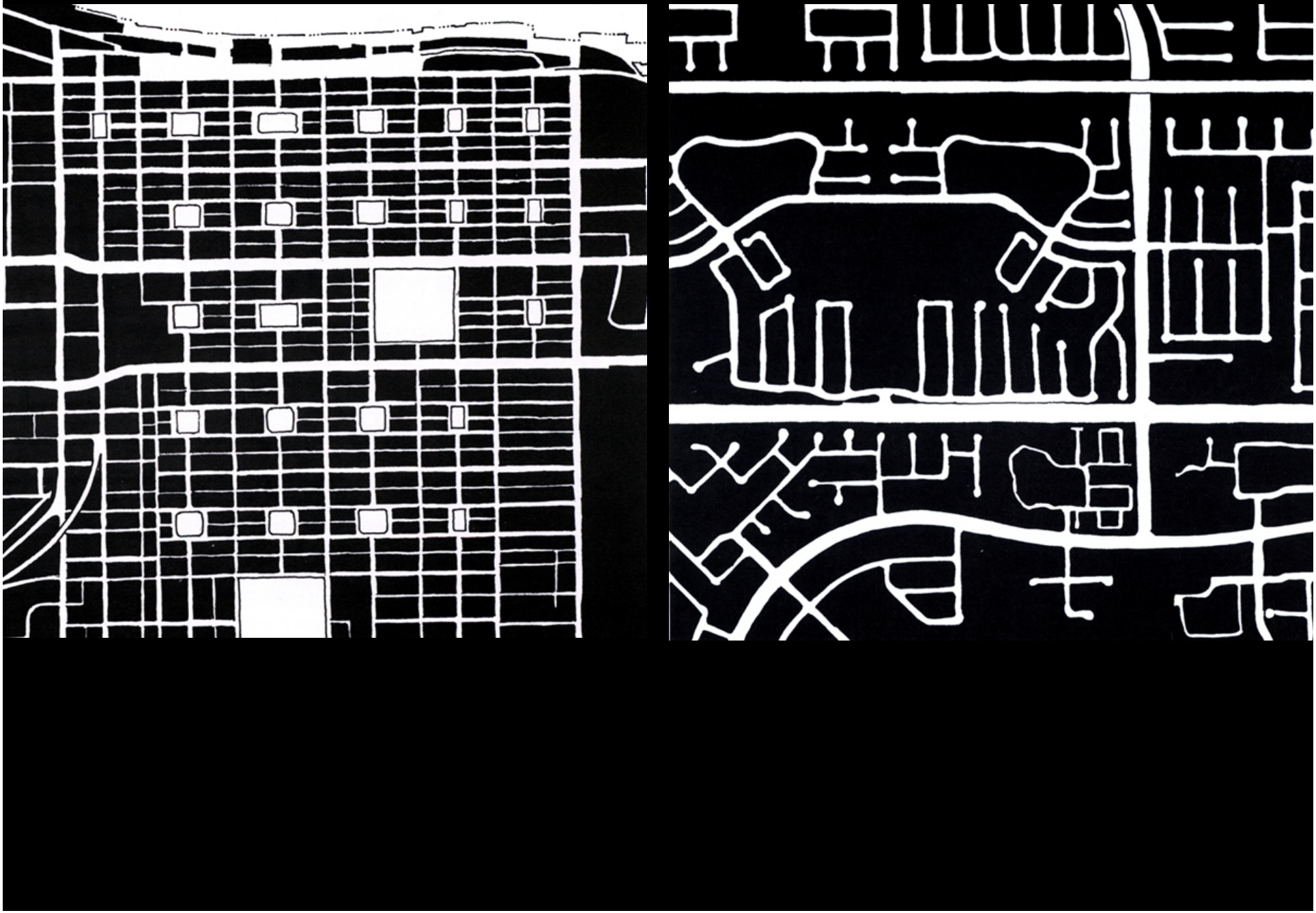




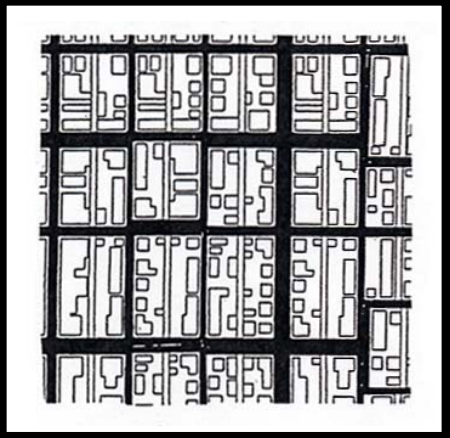




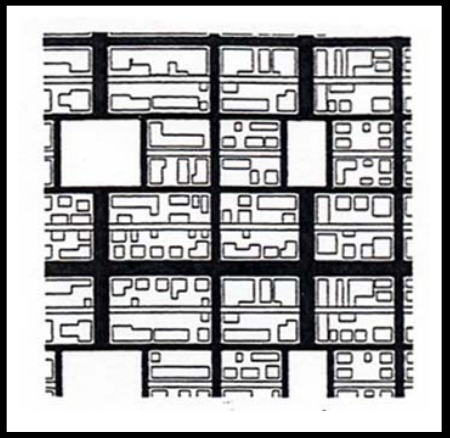




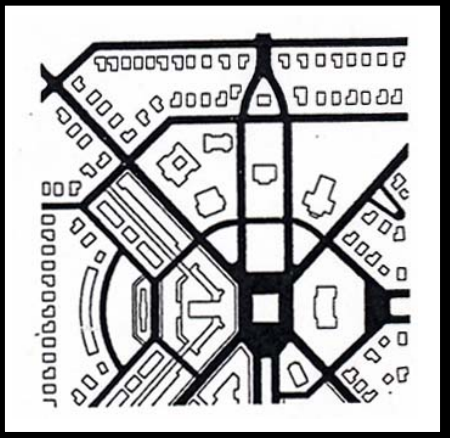
Connected Street Networks



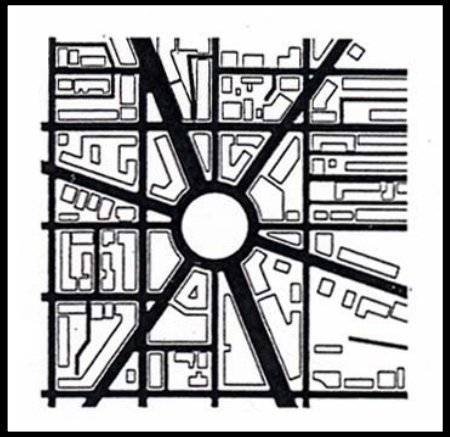
Grid



Grid & Squares

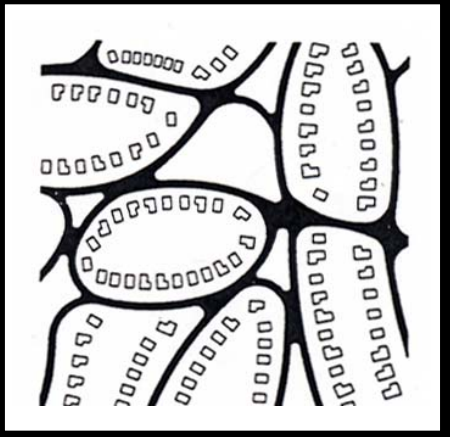


Web

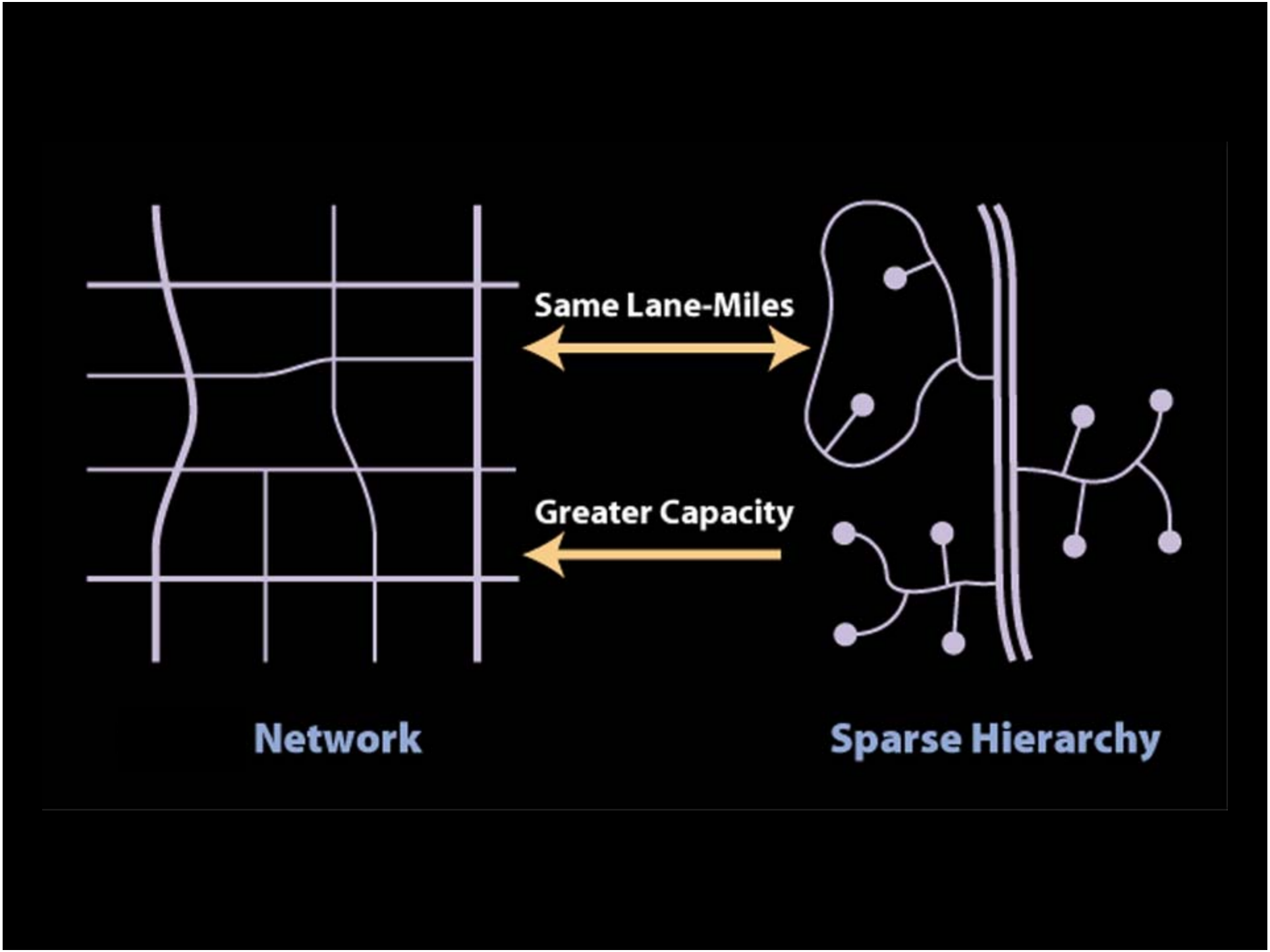


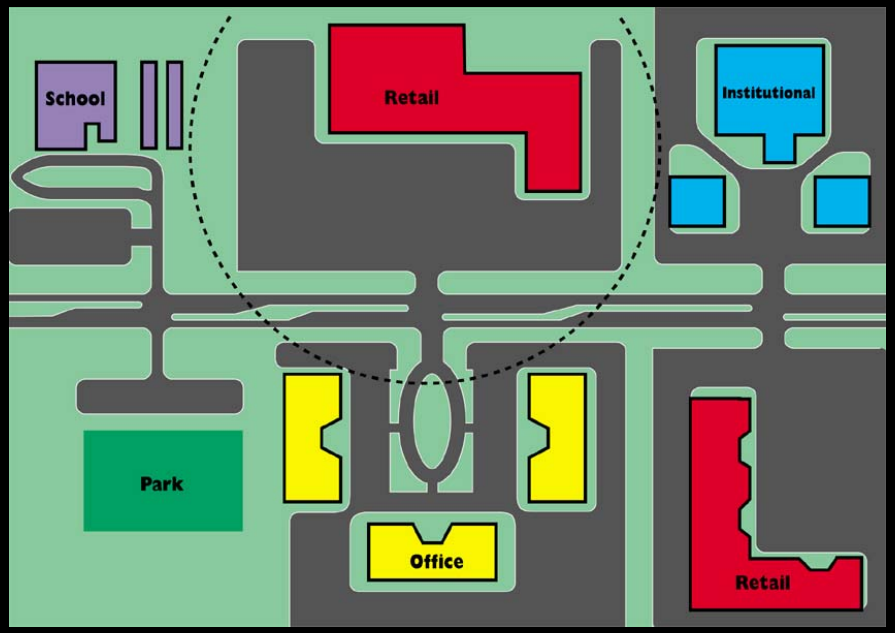
Radial

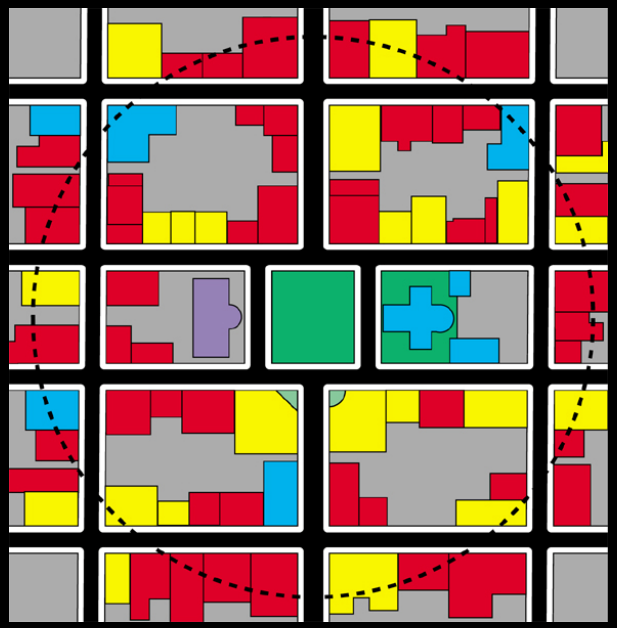
Irregular

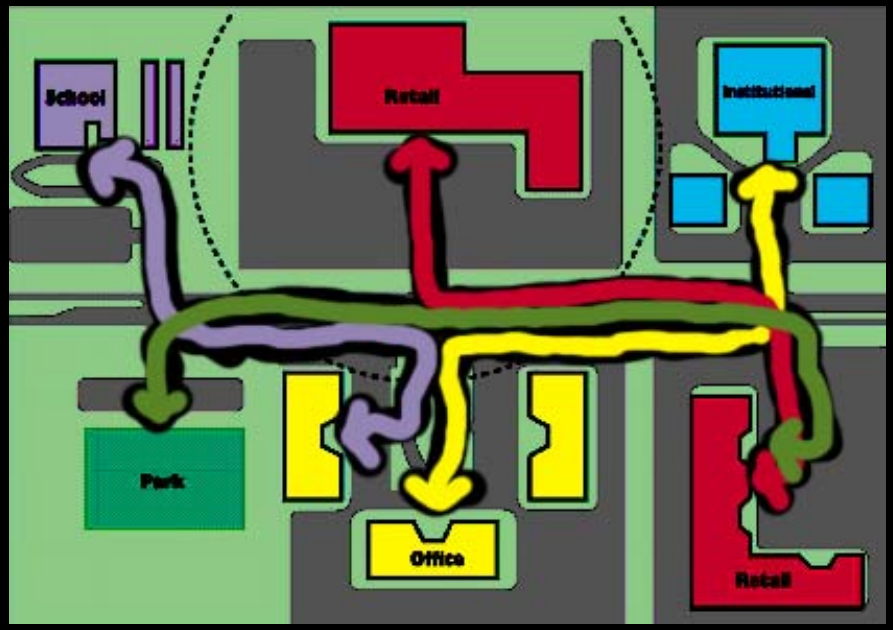


Curvilinear

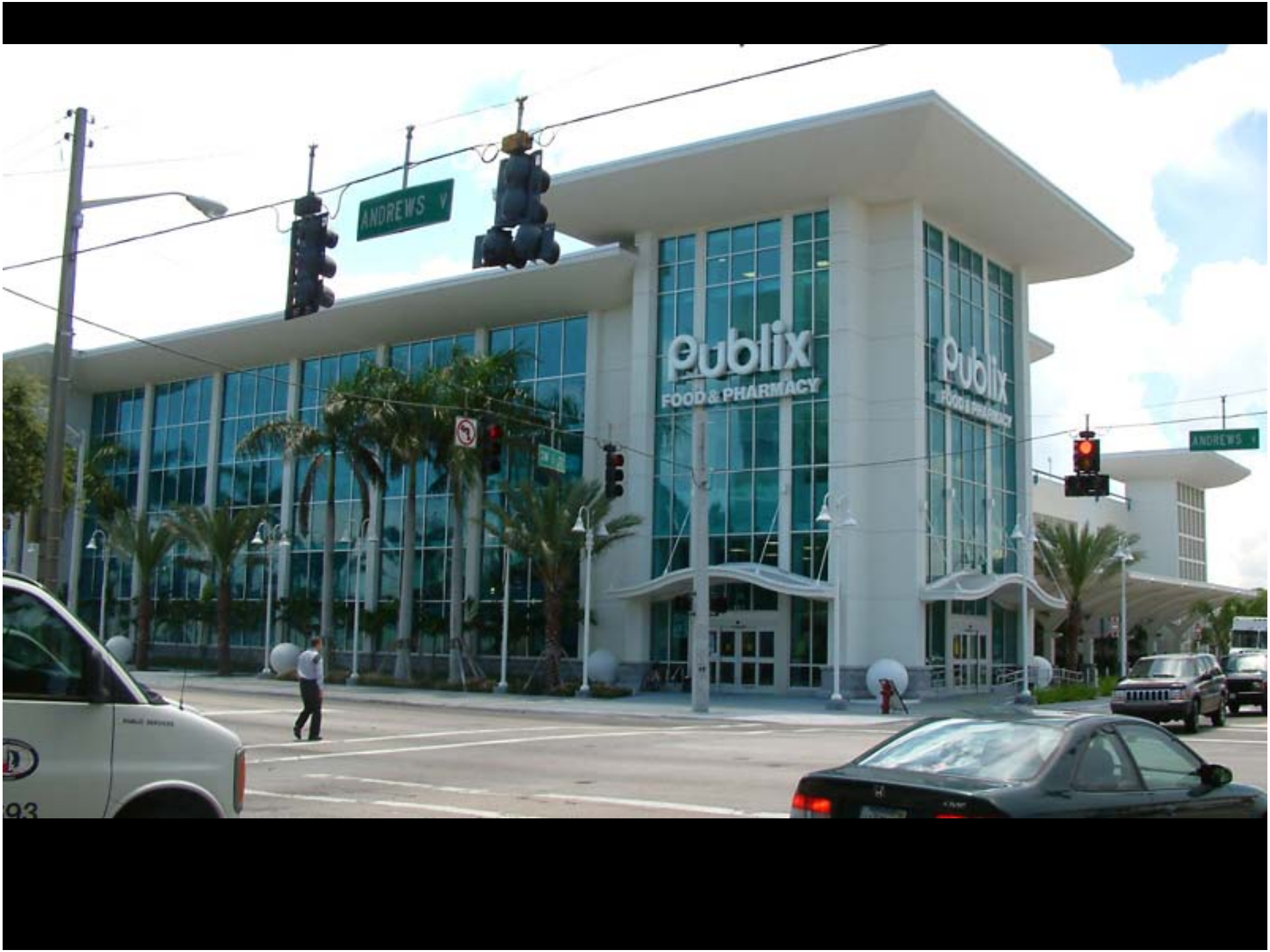

Same Lane-Miles
Greater Capacity
Network
Sparse Hierarchy


School
Retail
Institutional
Park
Office
Retail




School
Retail
Institutional
Park
Office
Retail


Wendy's
24
Wendy's
PICK UP WINDOW


ANDREWS
Publix
FOOD & PHARMACY
Publix
ANDREWS


ecakeFactory
URANT BAKERY BAR
THE CHEESECAKE FACTORY


T··Mobile·
new balance
winter park
new balance
winter park


Boxes & Packing Supplies
Self Storage Center
SHURGARD
Air Conditioned Spaces
Kim J


THE HOME DEPOT


75 units/acre


Sunset Drive
MANOR


Sunset Drive

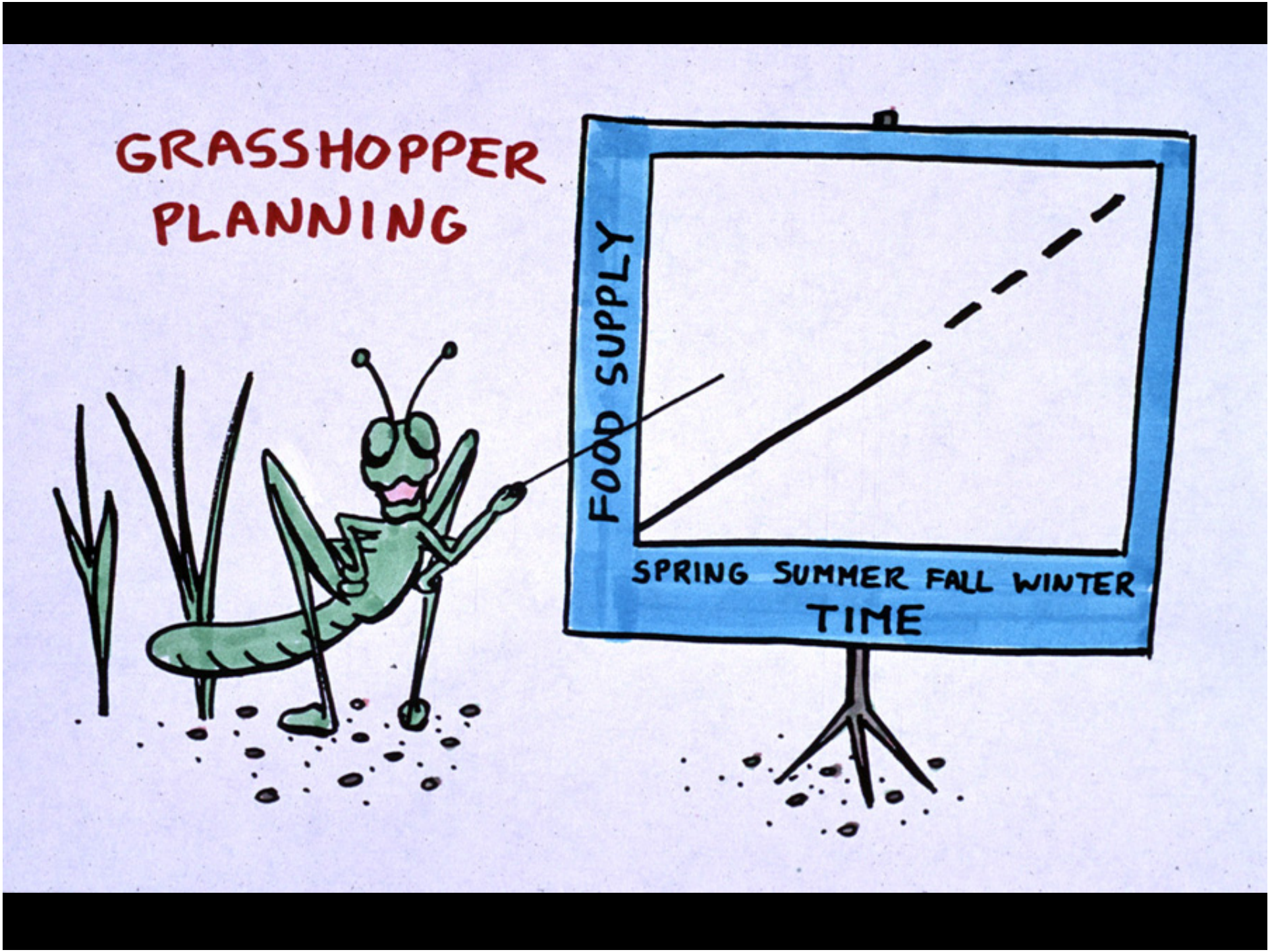

Sunset Drive


Sunset Drive

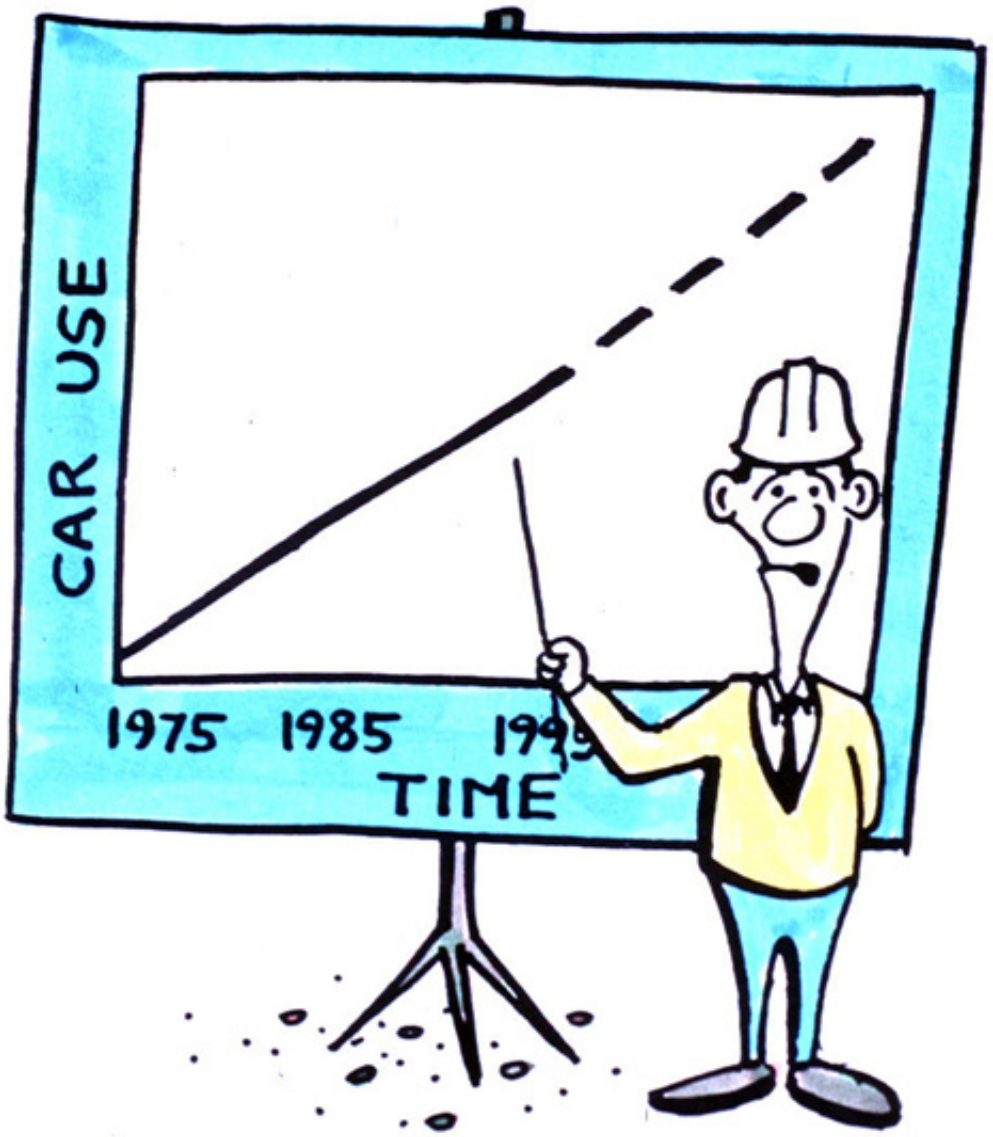

Stationery
Greeting Cards


Stationery
Greeting Cards

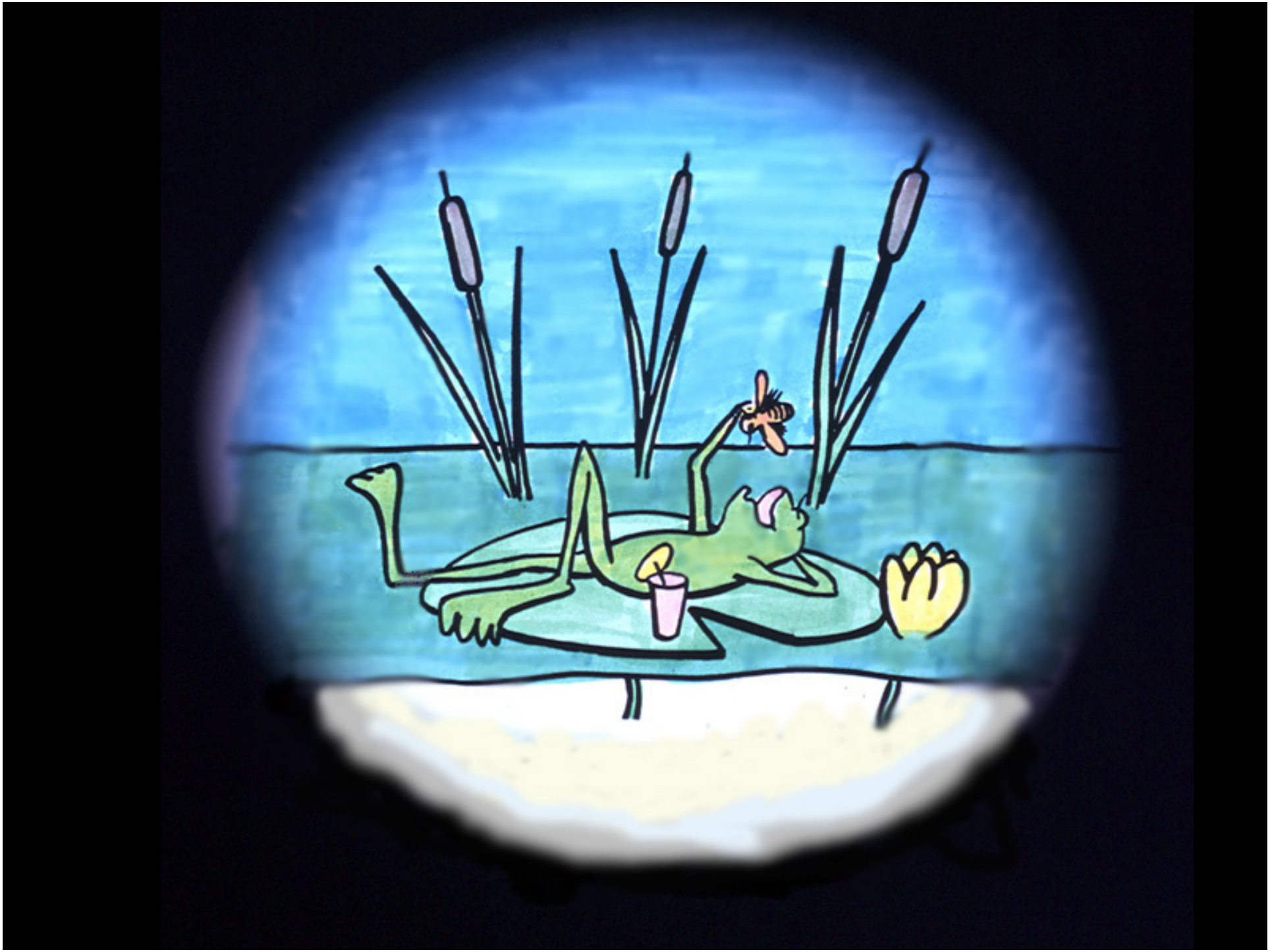

Stationery
Greeting Cards


GRASSHOPPER
PLANNING
FOOD SUPPLY
SPRING SUMMER FALL WINTER
TIME

GRASSHOPPER PLANNING



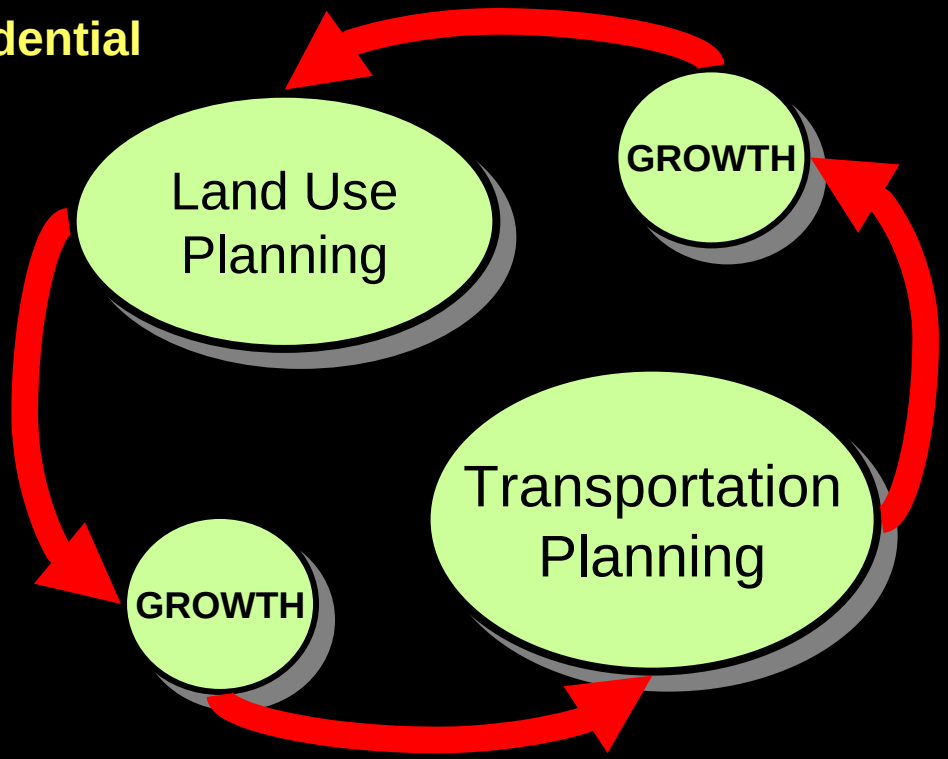
OUR MODEL
TELLS US THAT
ANOTHER BRIDGE
WILL BE NEEDED
BY 2030



Conventional Development Cycle

INPUTS
- **Auto Oriented Business**
- **Single Use Zoning**
- **Single Family Residential**

OUTCOMES
- **Wider Roads**
- **Induced Traffic**
- **More Traffic**

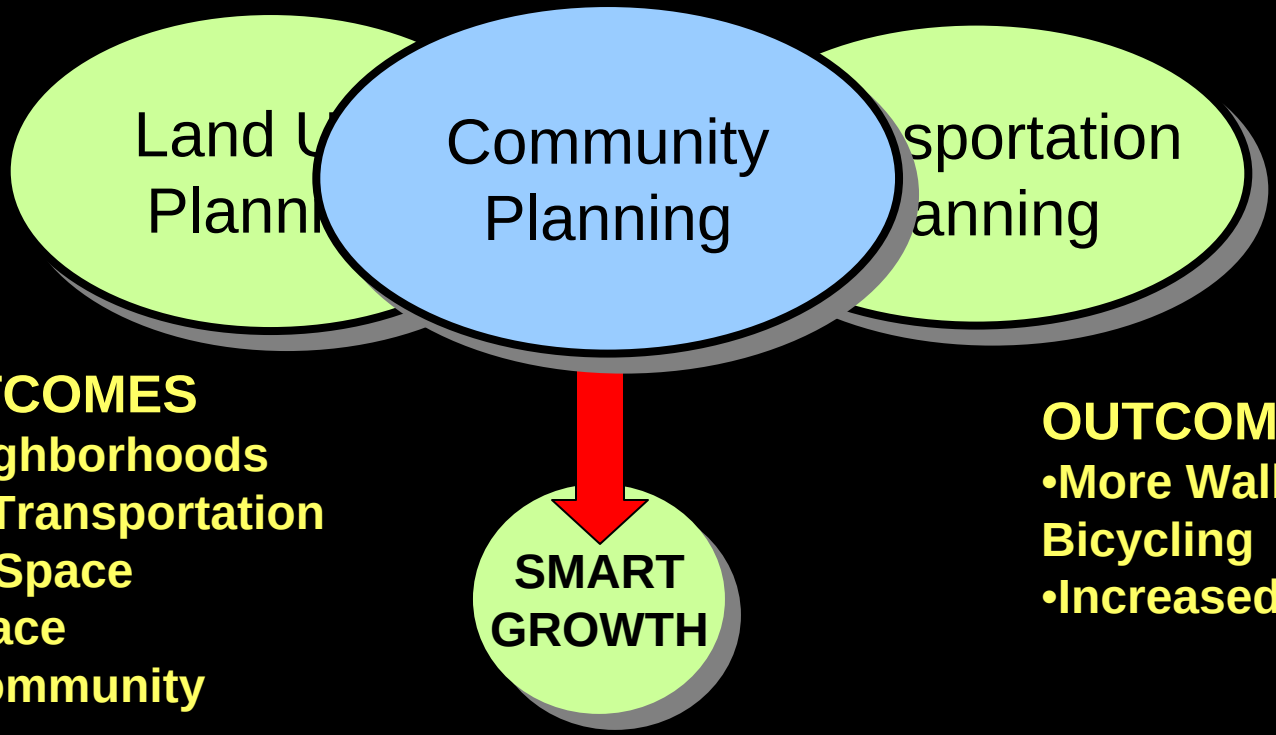


OUTCOMES
- **Isolated Neighborhoods**
- **Multiple Automobile Trips**
- **Poor Mobility**
- **Difficult Walking**

INPUTS
- **Traffic Demand Forecasting**
- **Congestion**
- **LOS**

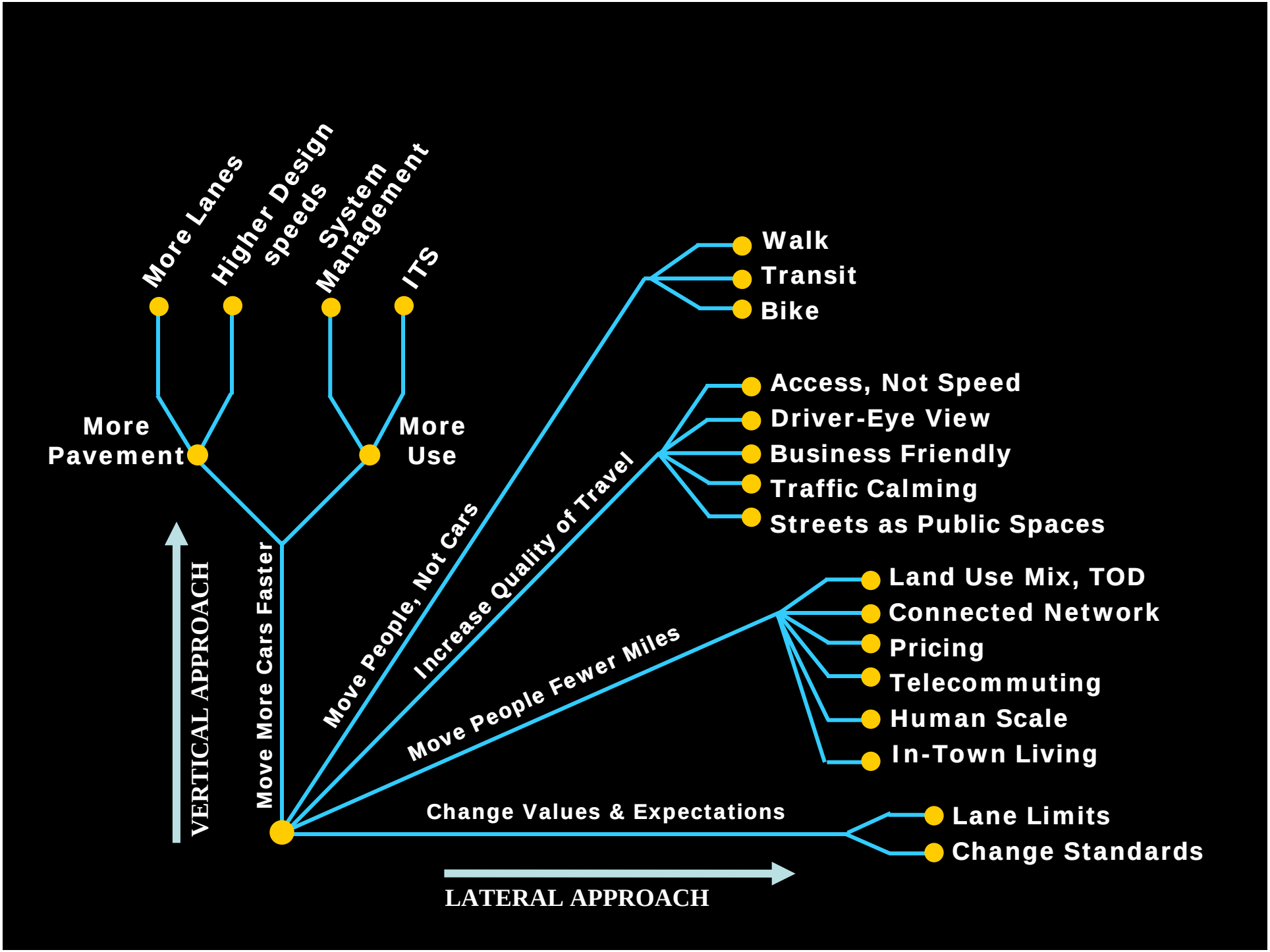
Healthy Development Cycle

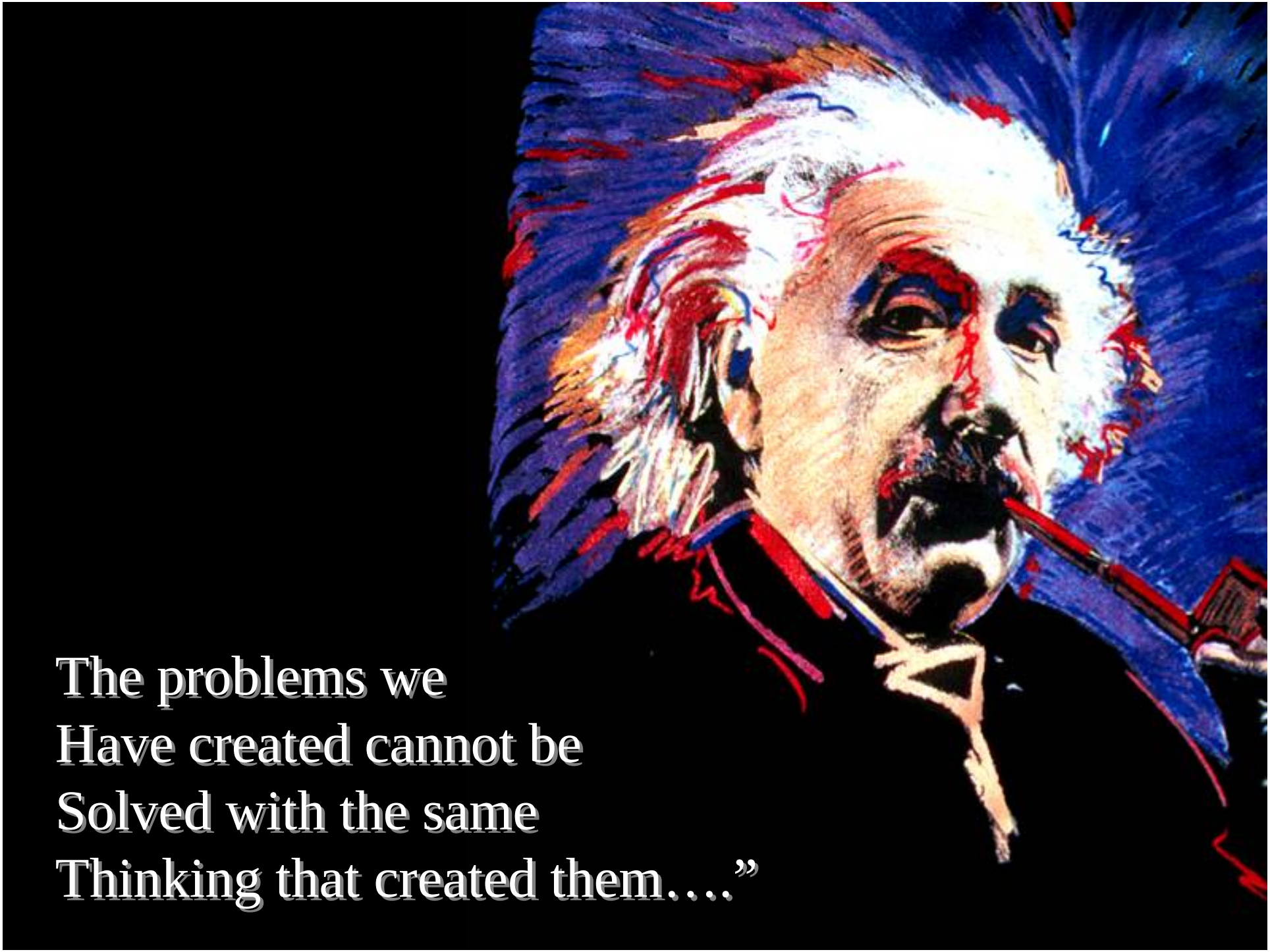
INPUTS
- **Diversity of Business**
- **Mixed Use Zoning**
- **Diversity of Residential Units**
- **Context Sensitive Design**
- **Community Involvement**

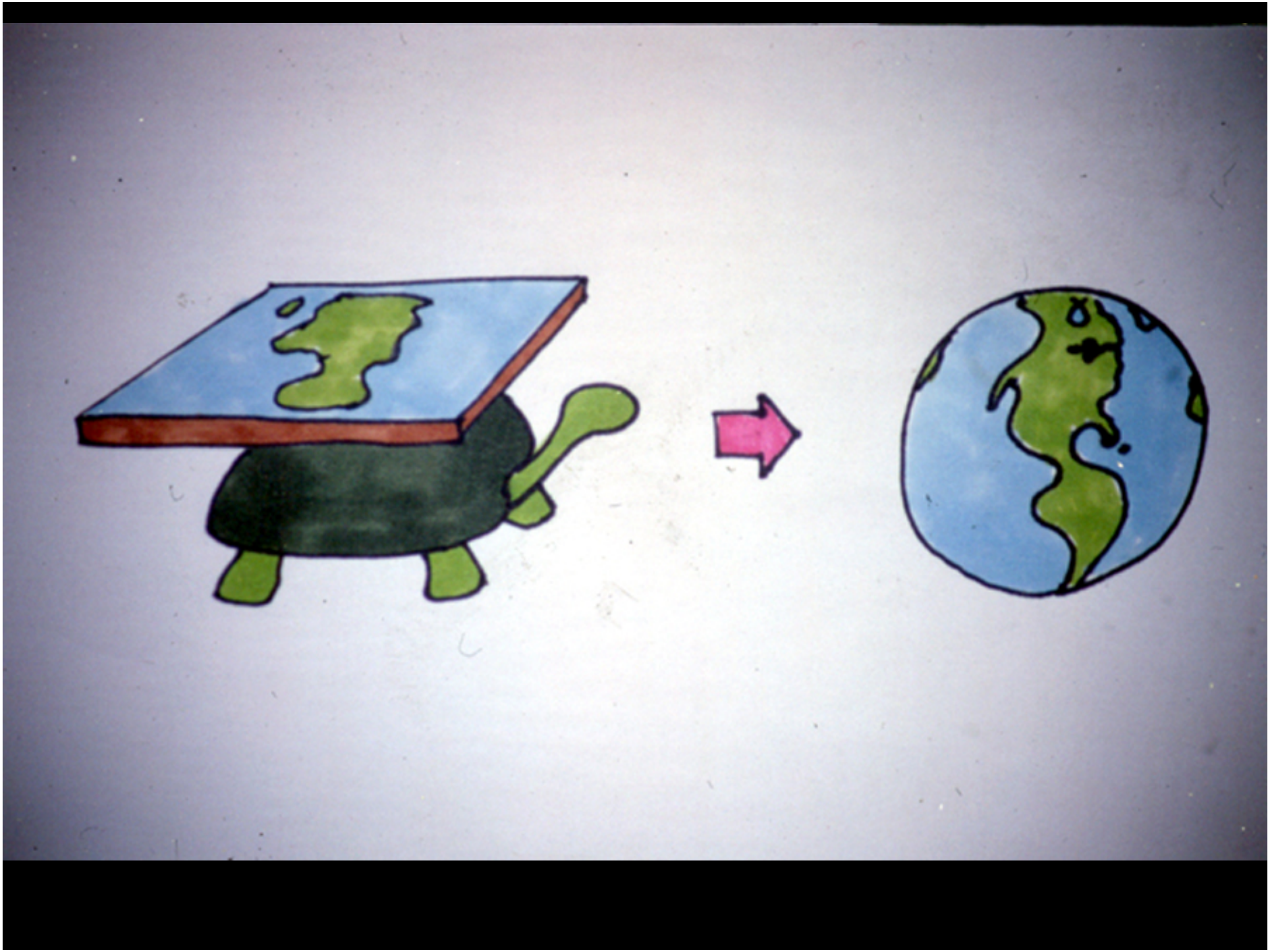


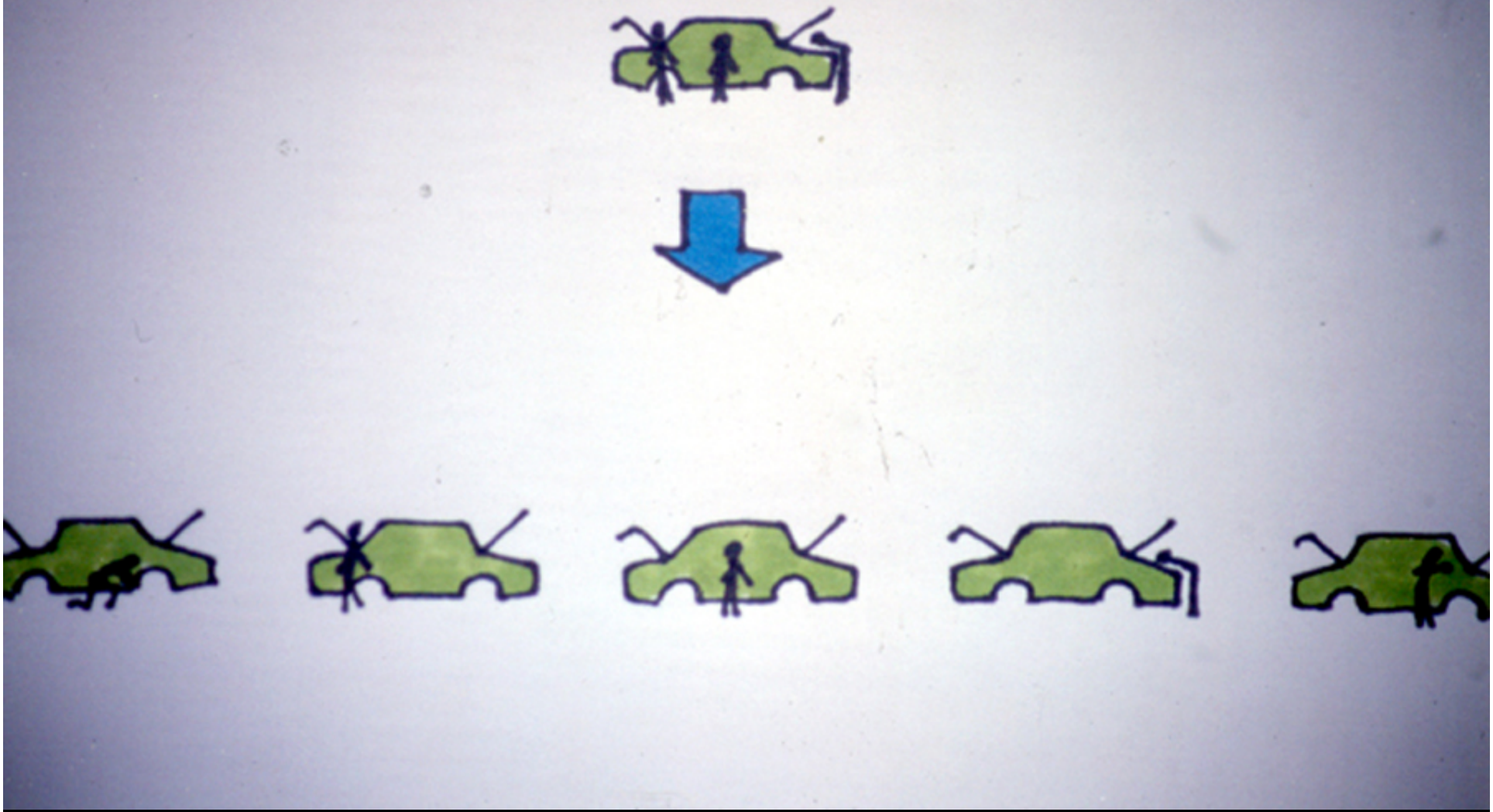
OUTCOMES
- **Healthy Neighborhoods**
- **Choices of Transportation**
- **More Open Space**
- **Sense of Place**
- **Sense of Community**

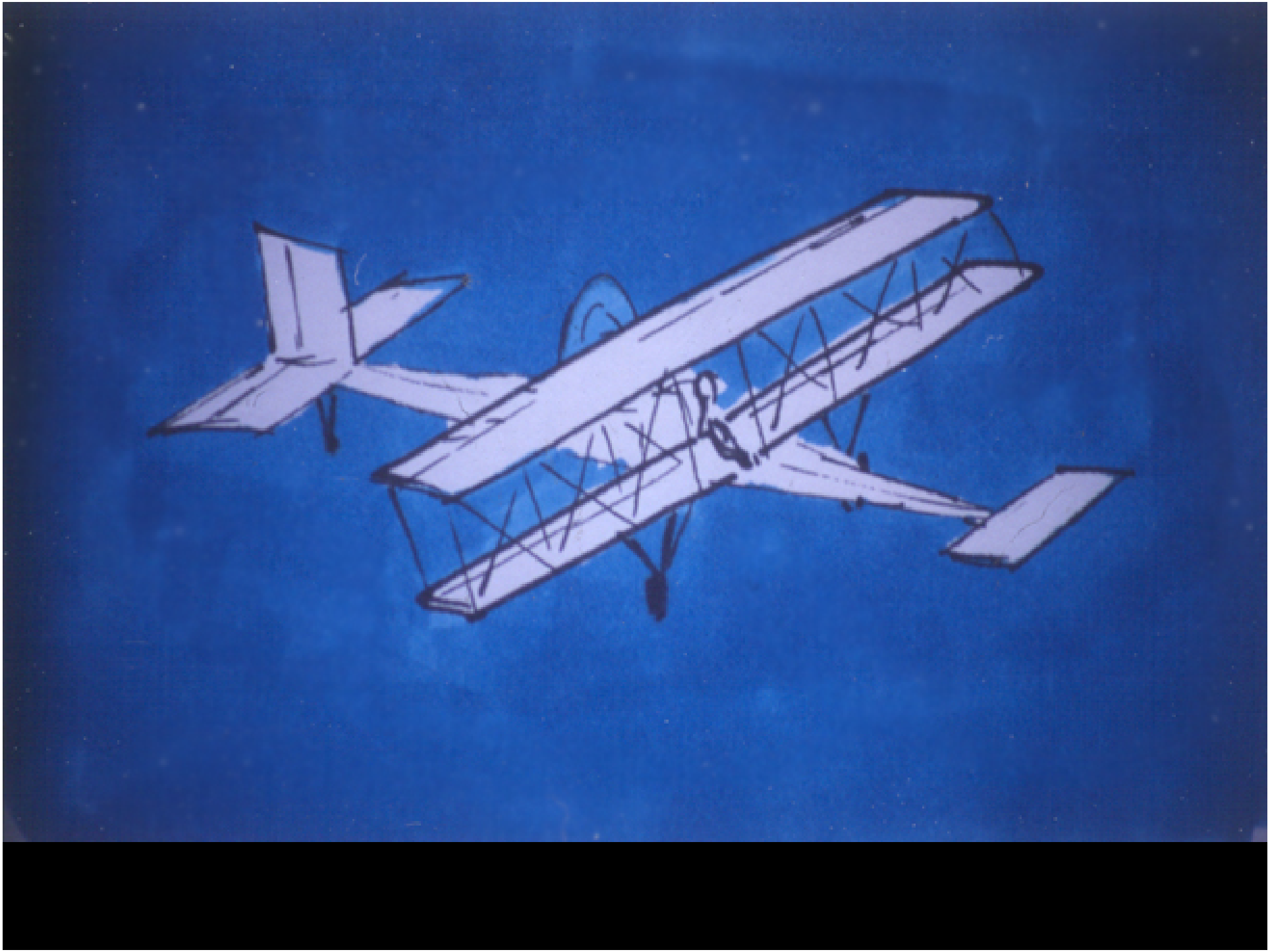
OUTCOMES
- **More Walking & Bicycling**
- **Increased Access**

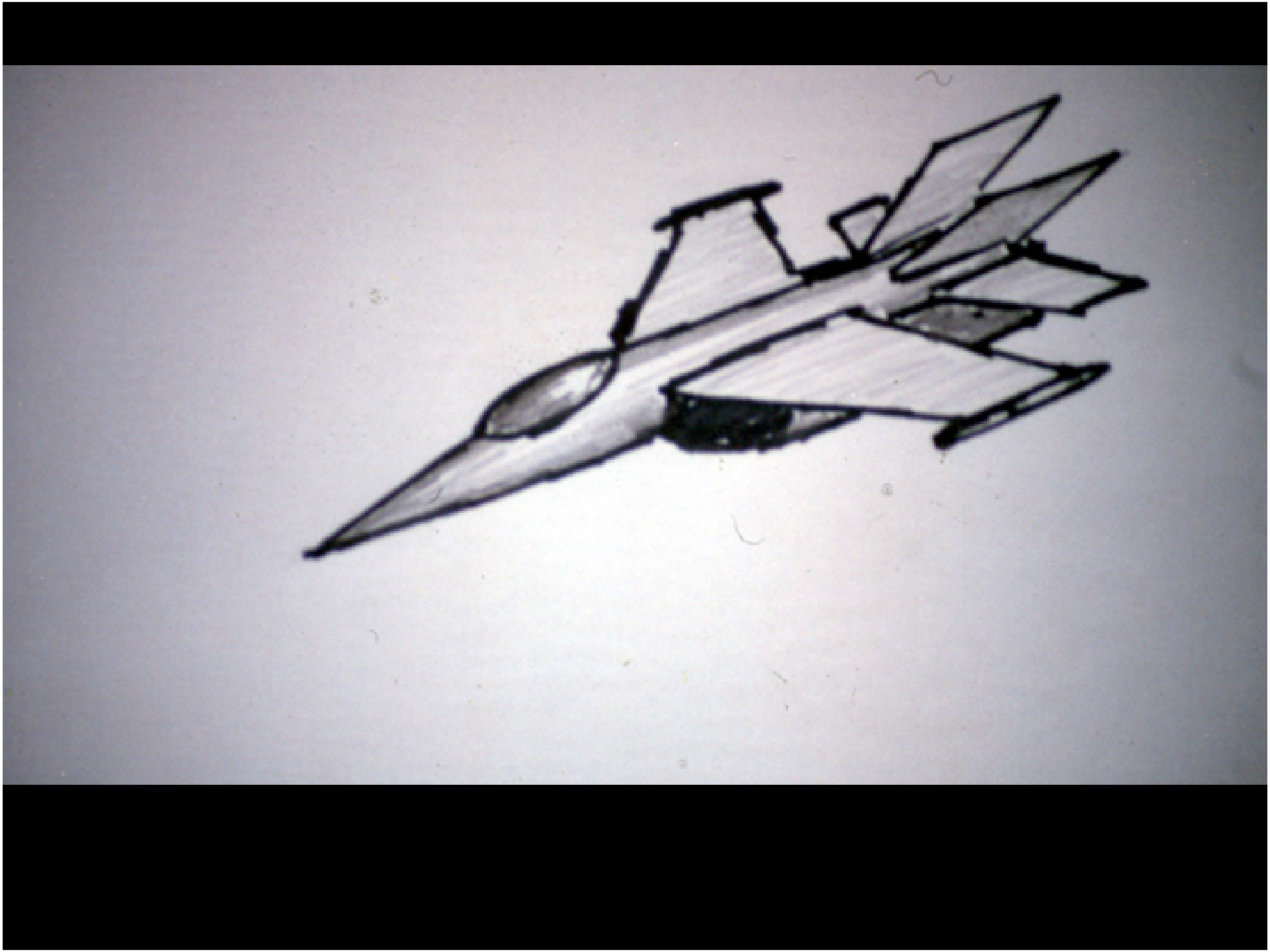

More Lanes
Higher Design speeds
System Management
ITS
More Pavement
More Use
Move More Cars Faster
VERTICAL APPROACH
Move People, Not Cars
Walk
Transit
Bike
Increase Quality of Travel
Access, Not Speed
Driver-Eye View
Business Friendly
Traffic Calming
Streets as Public Spaces
Move People Fewer Miles
Land Use Mix, TOD
Connected Network
Pricing
Telecommuting
Human Scale
In-Town Living
Change Values & Expectations
Lane Limits
Change Standards
LATERAL APPROACH

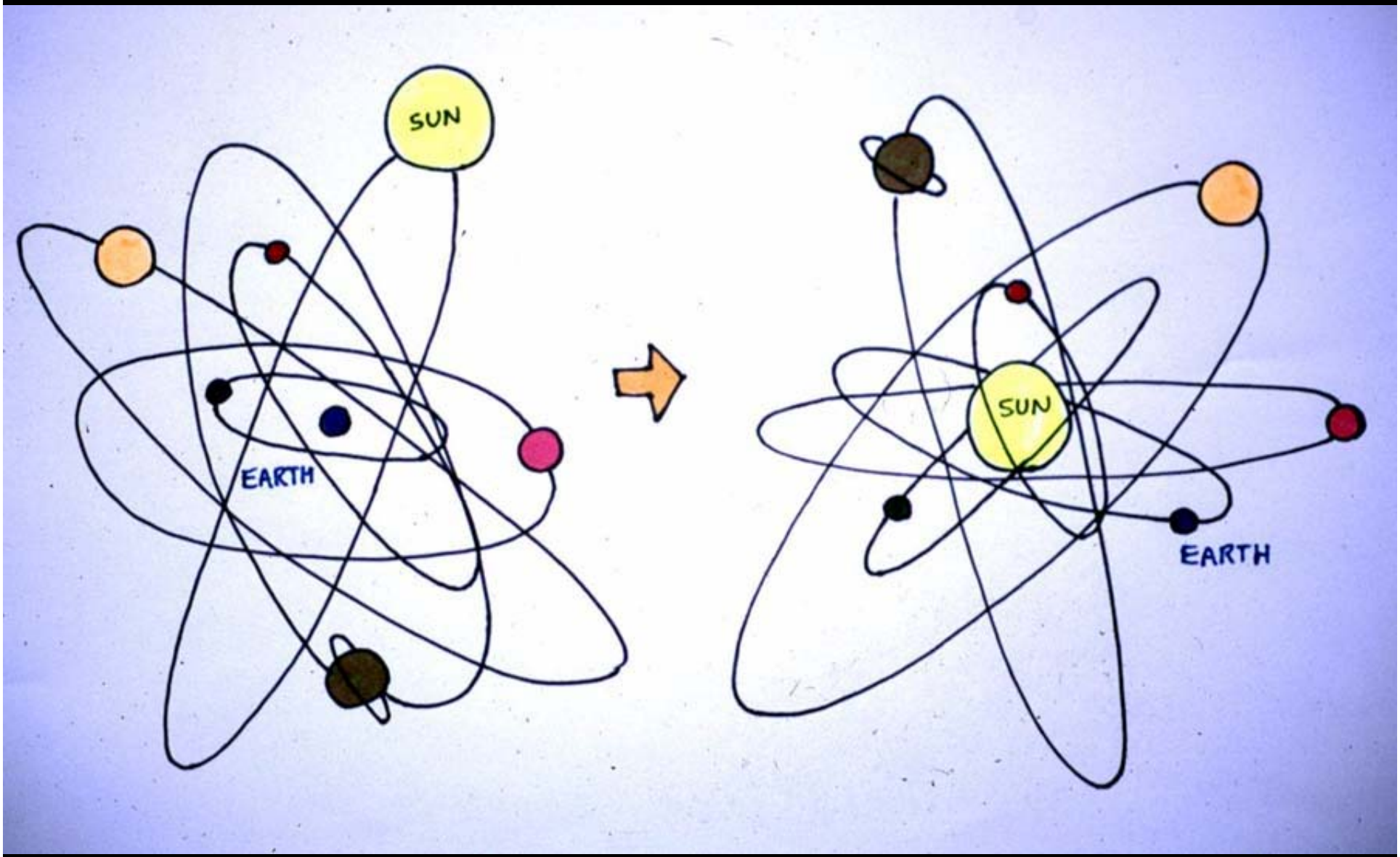

The problems we
Have created cannot be
Solved with the same
Thinking that created them….”









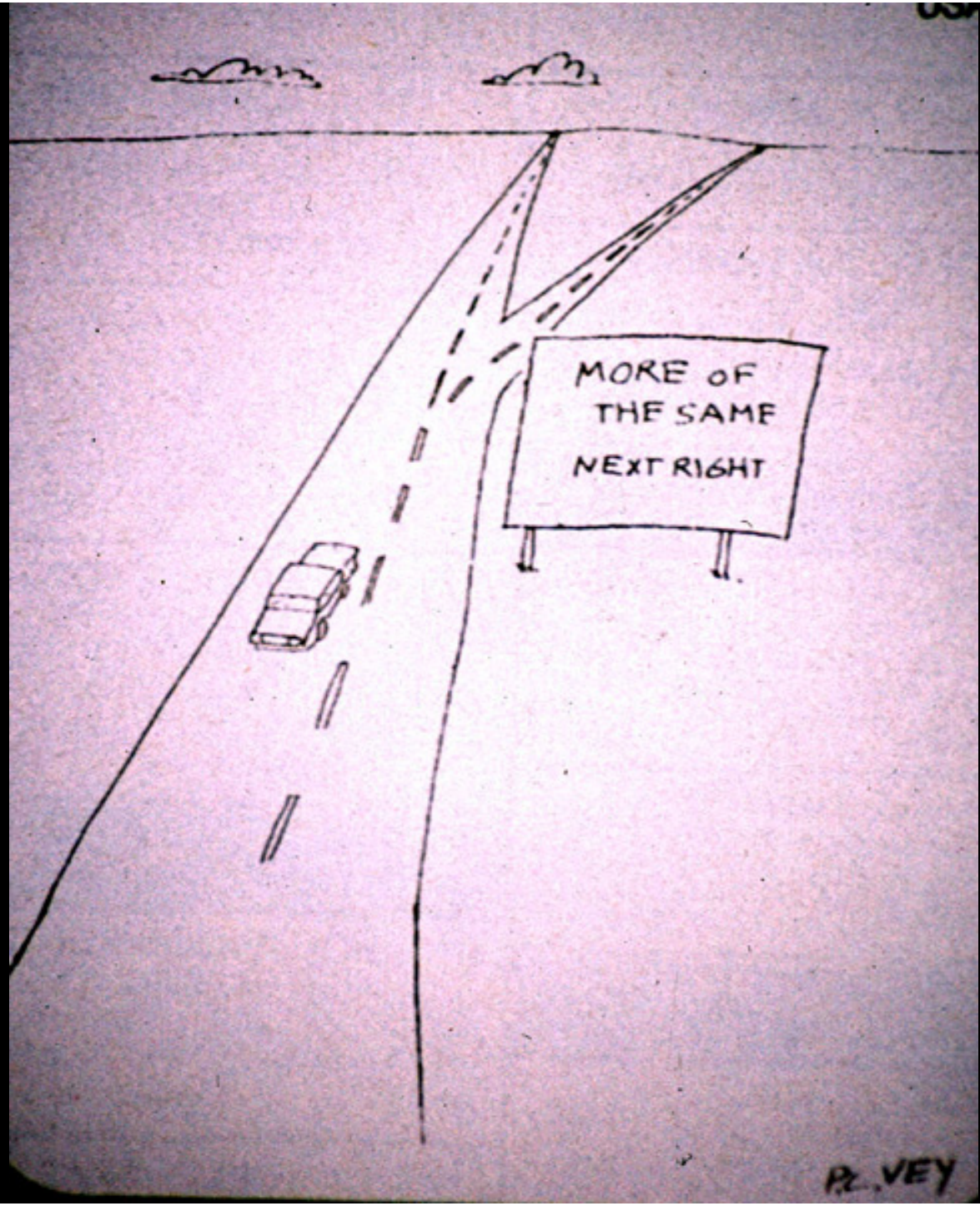

SUN
EARTH
SUN
EARTH

“…the possible benefits of required seat belts would not justify the costs to the manufacturers and the public.”

1970

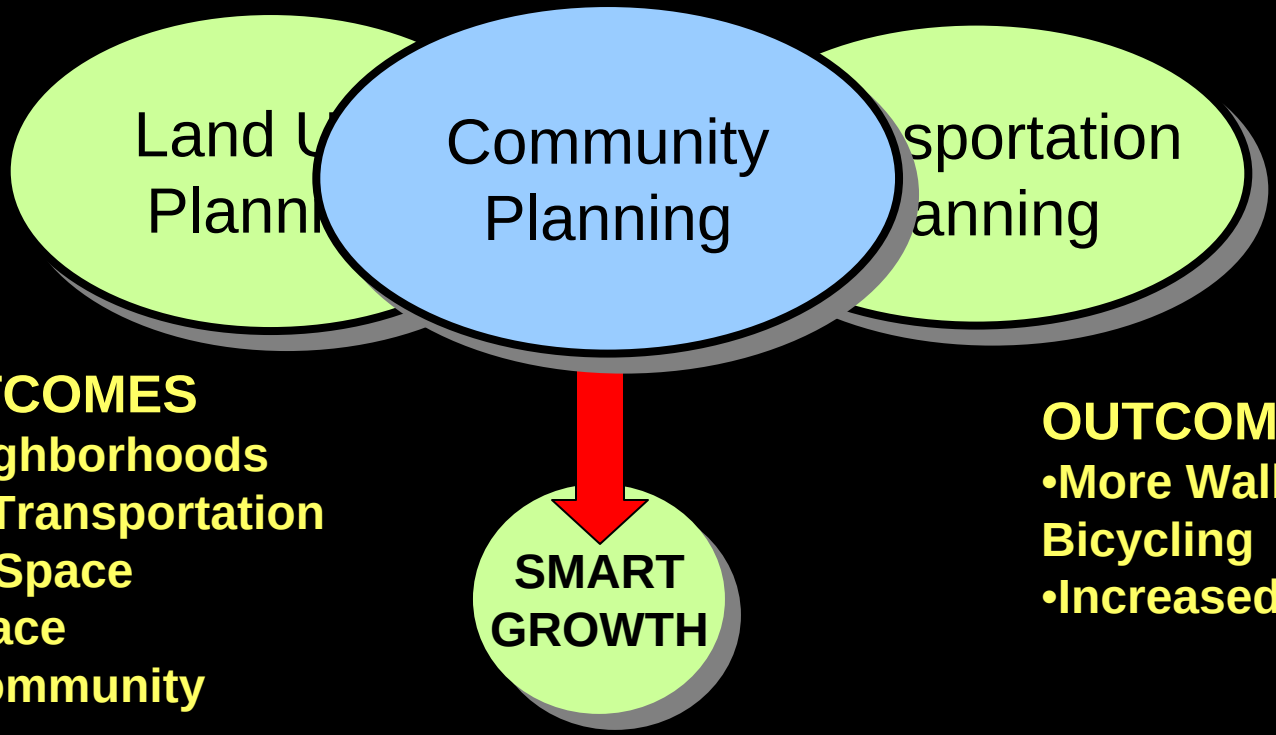
"…the possible benefits of required seat belts would not justify the costs to the manufacturers and the public."

National Highway Traffic Safety Administration, 1970


MORE OF
THE SAME
NEXT RIGHT
P. VEY

Healthy Development Cycle

INPUTS
- **Diversity of Business**
- **Mixed Use Zoning**
- **Diversity of Residential Units**
- **Context Sensitive Design**
- **Community Involvement**



OUTCOMES
- **Healthy Neighborhoods**
- **Choices of Transportation**
- **More Open Space**
- **Sense of Place**
- **Sense of Community**

OUTCOMES
- **More Walking & Bicycling**
- **Increased Access**